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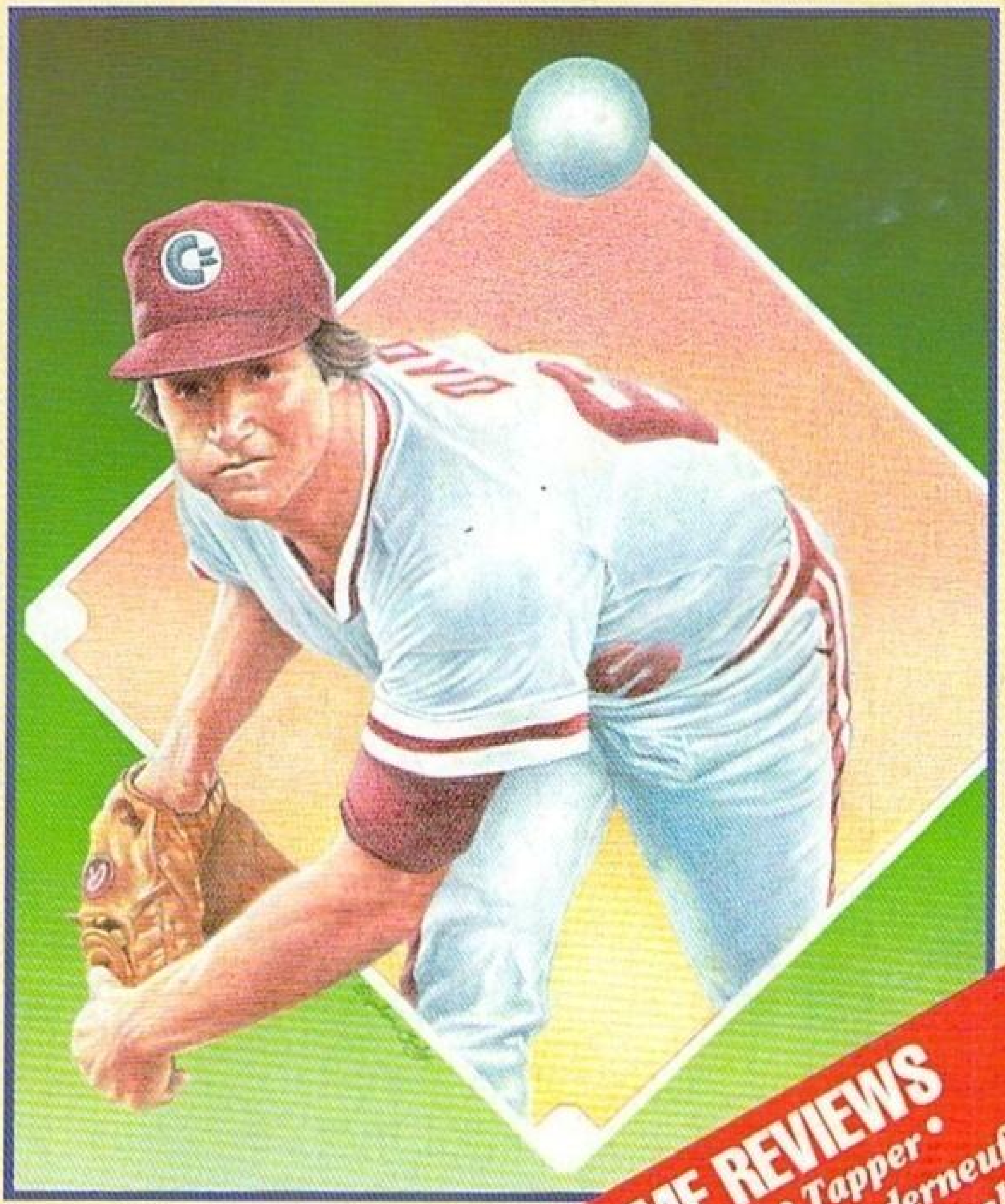

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GAME REVIEWS

The Hulk • Tapper •
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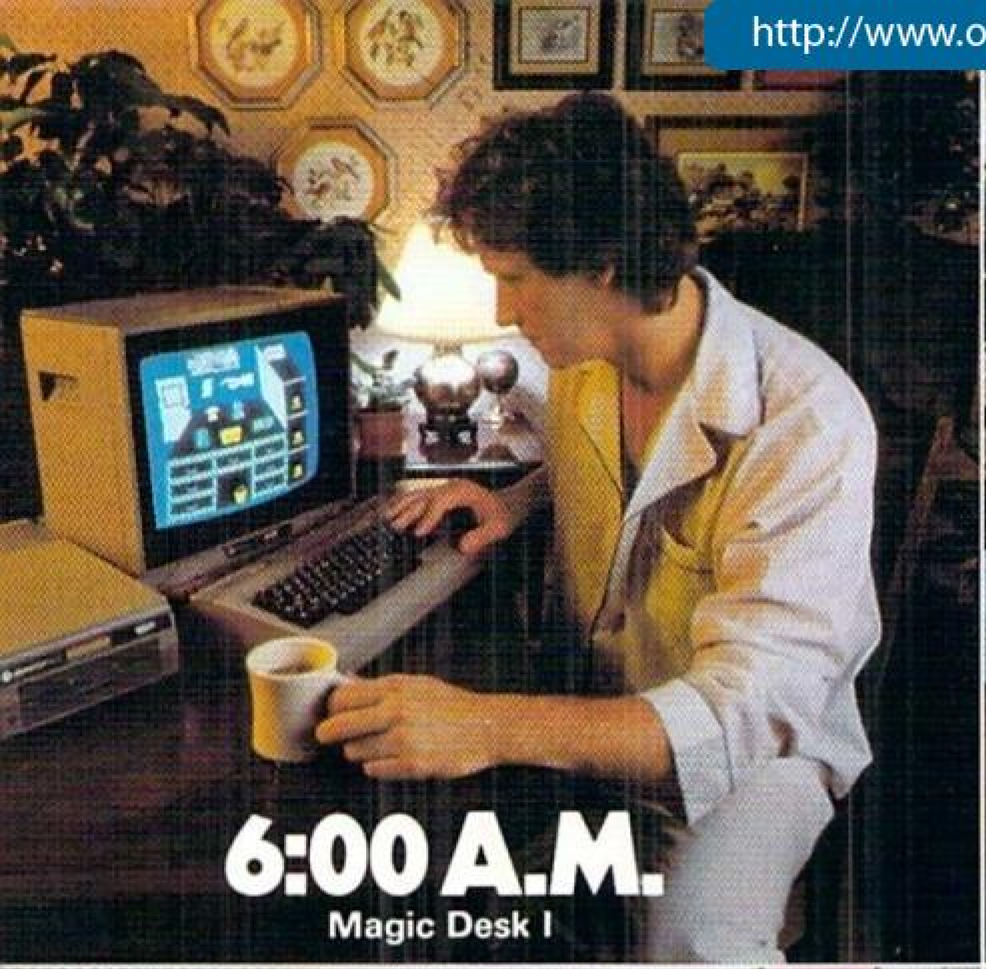
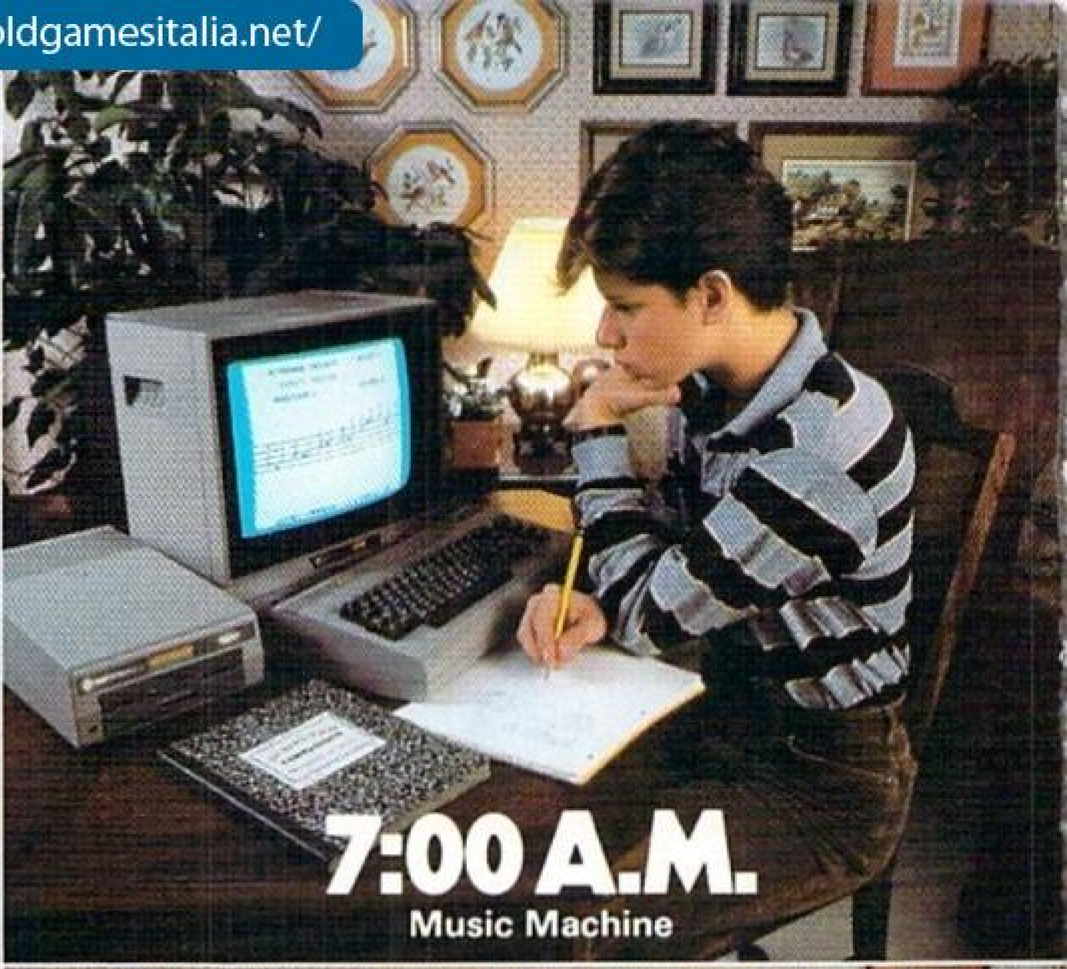
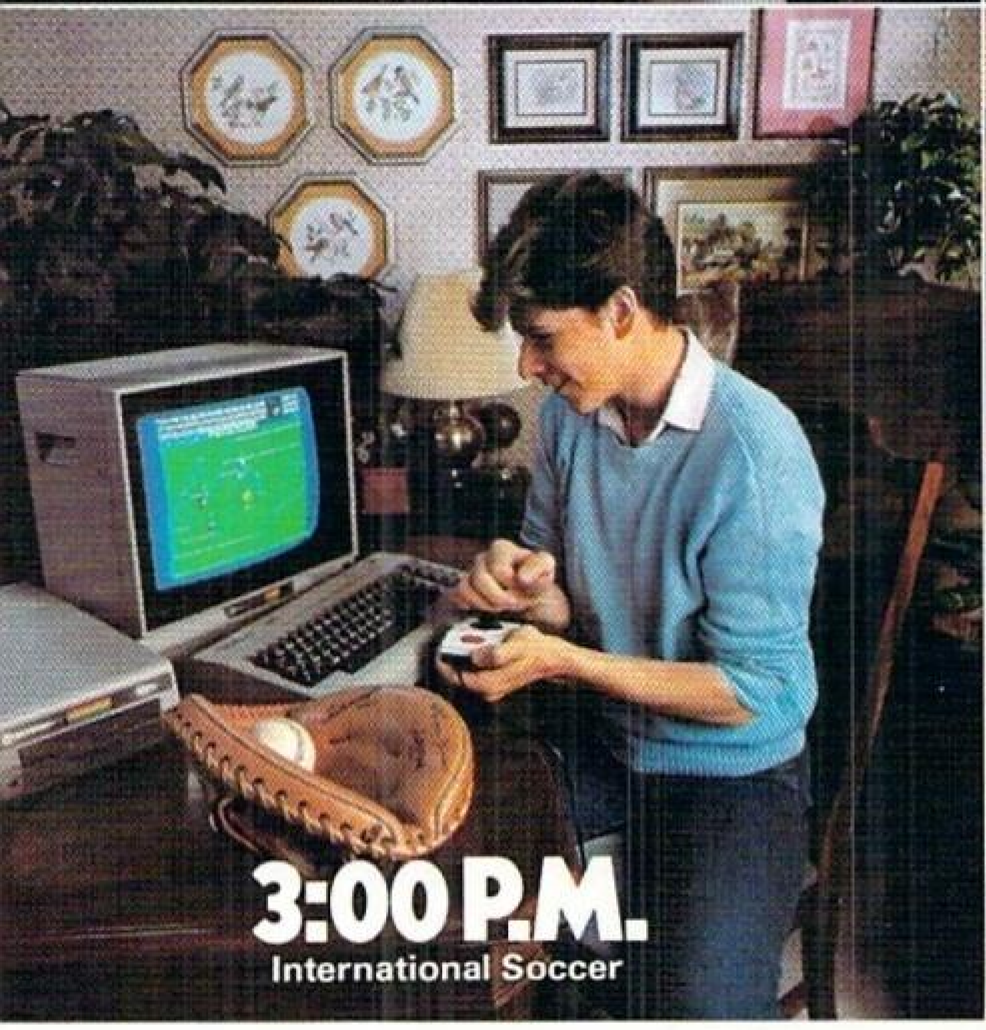
Astrologer • Stealth



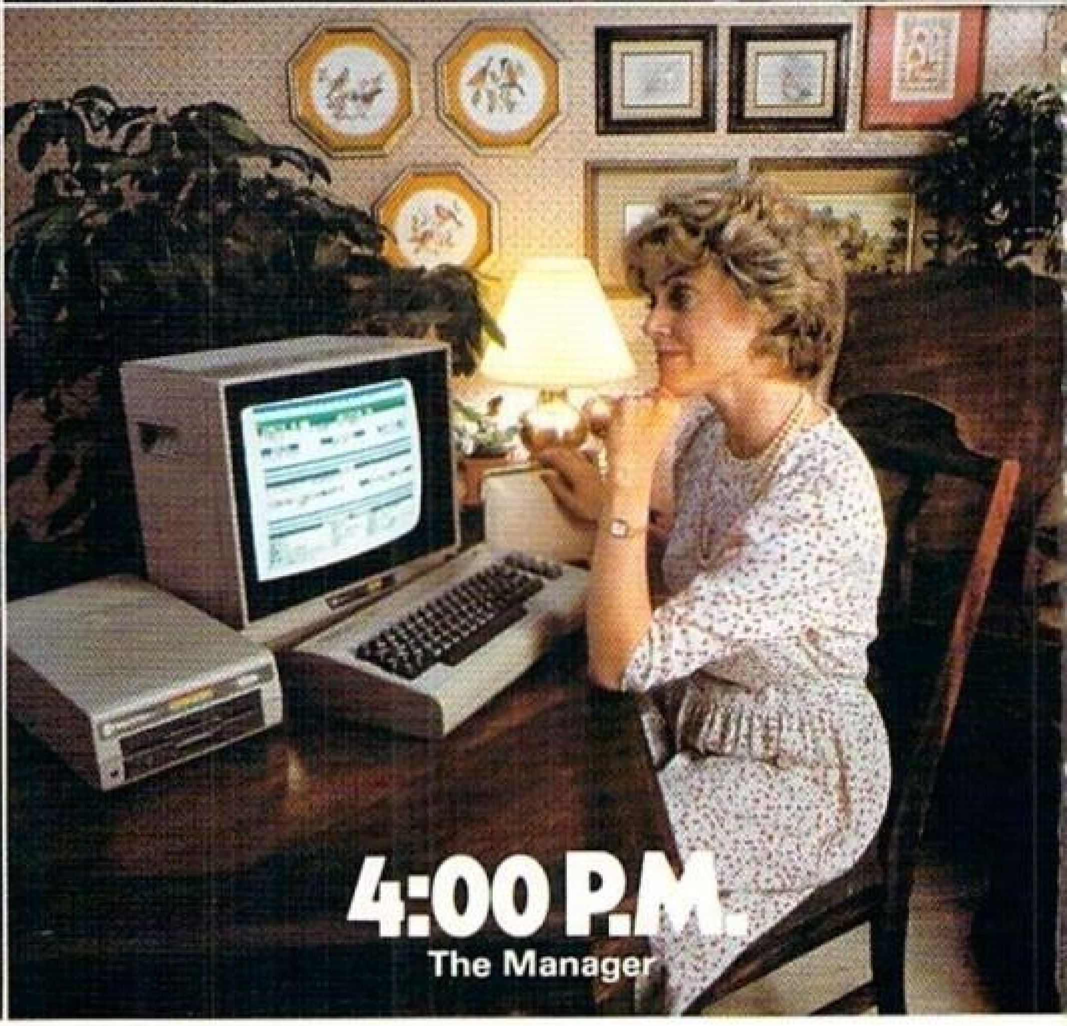
6:00 A.M.
Magic Desk I



7:00 A.M.
Music Machine



3:00 P.M.
International Soccer



4:00 P.M.
The Manager

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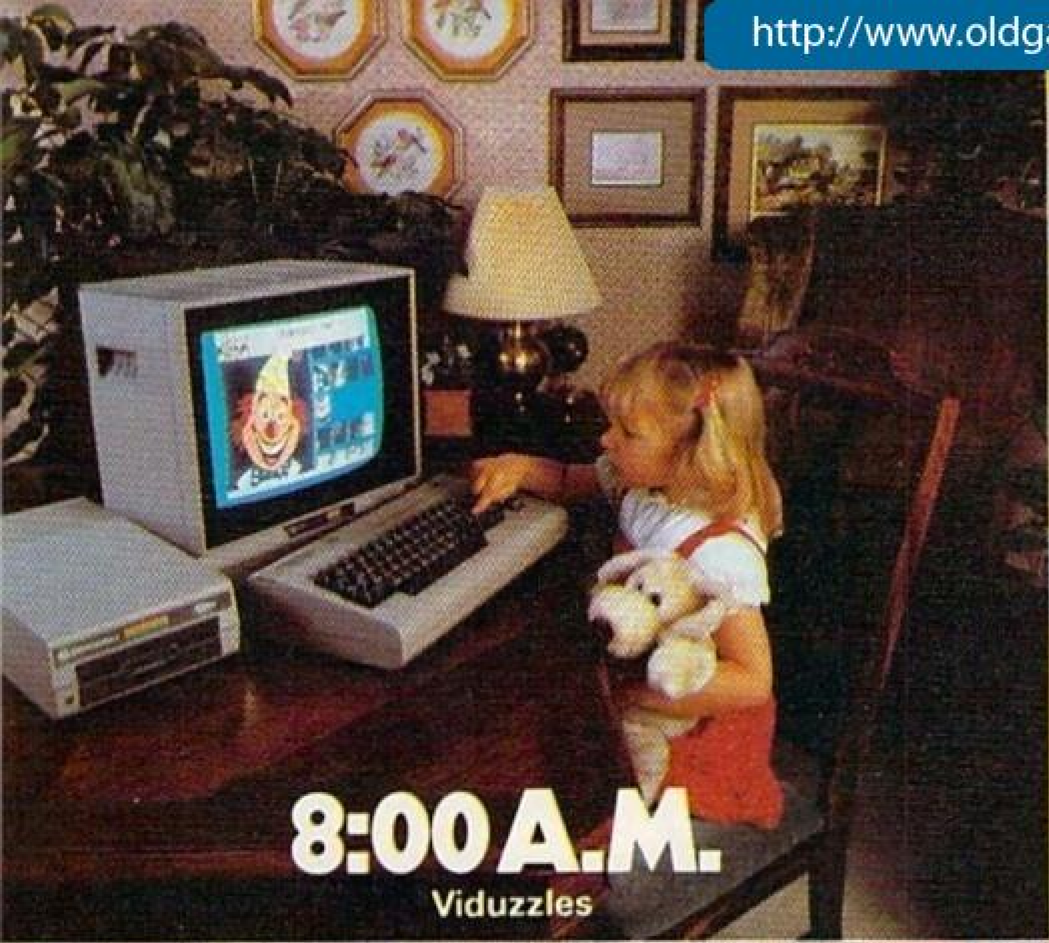
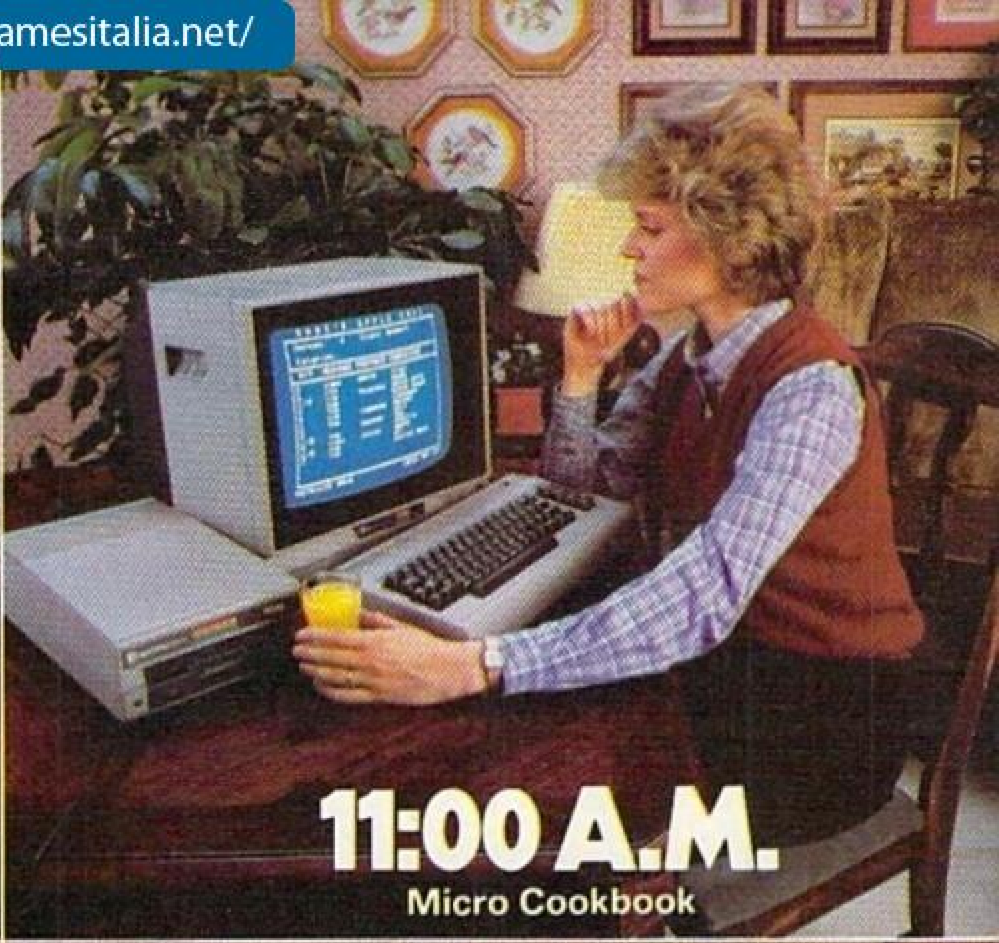
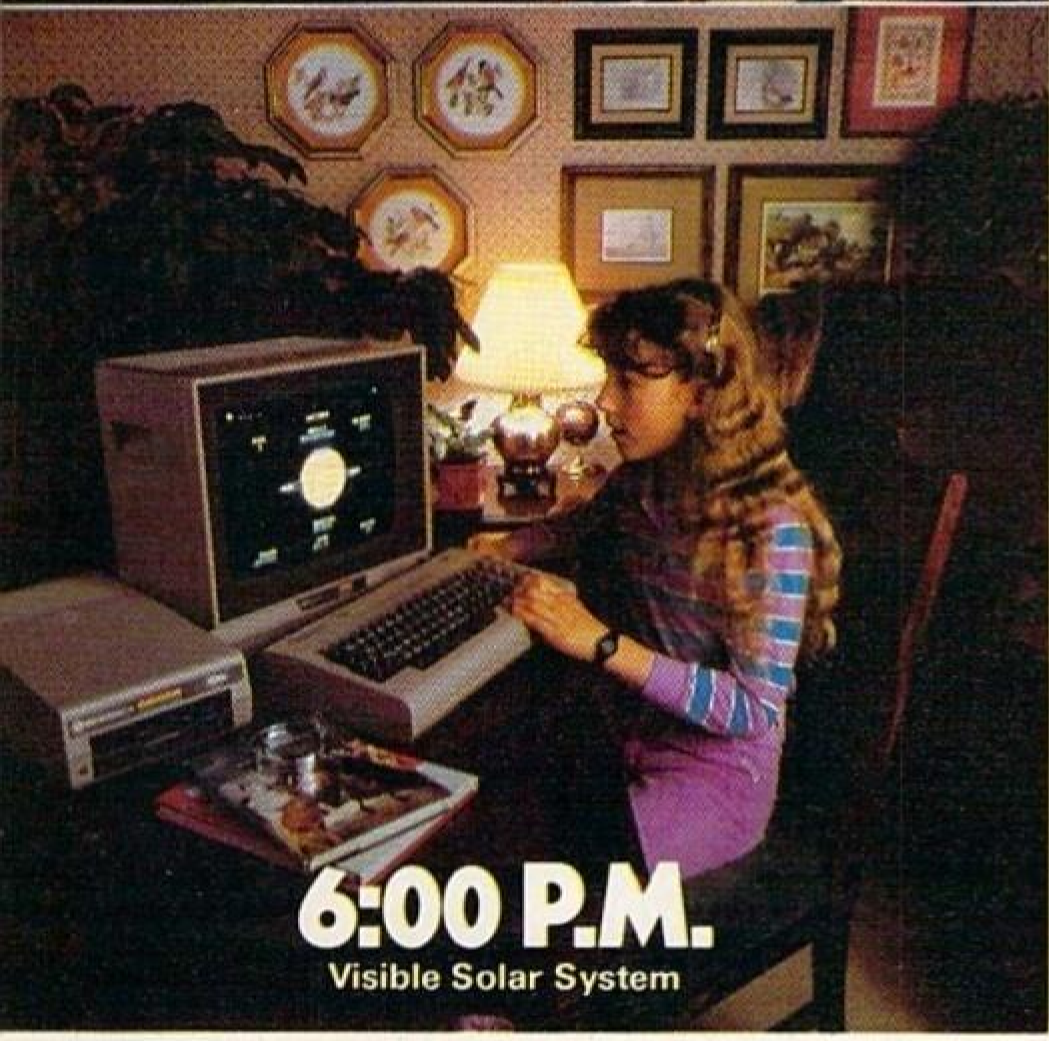


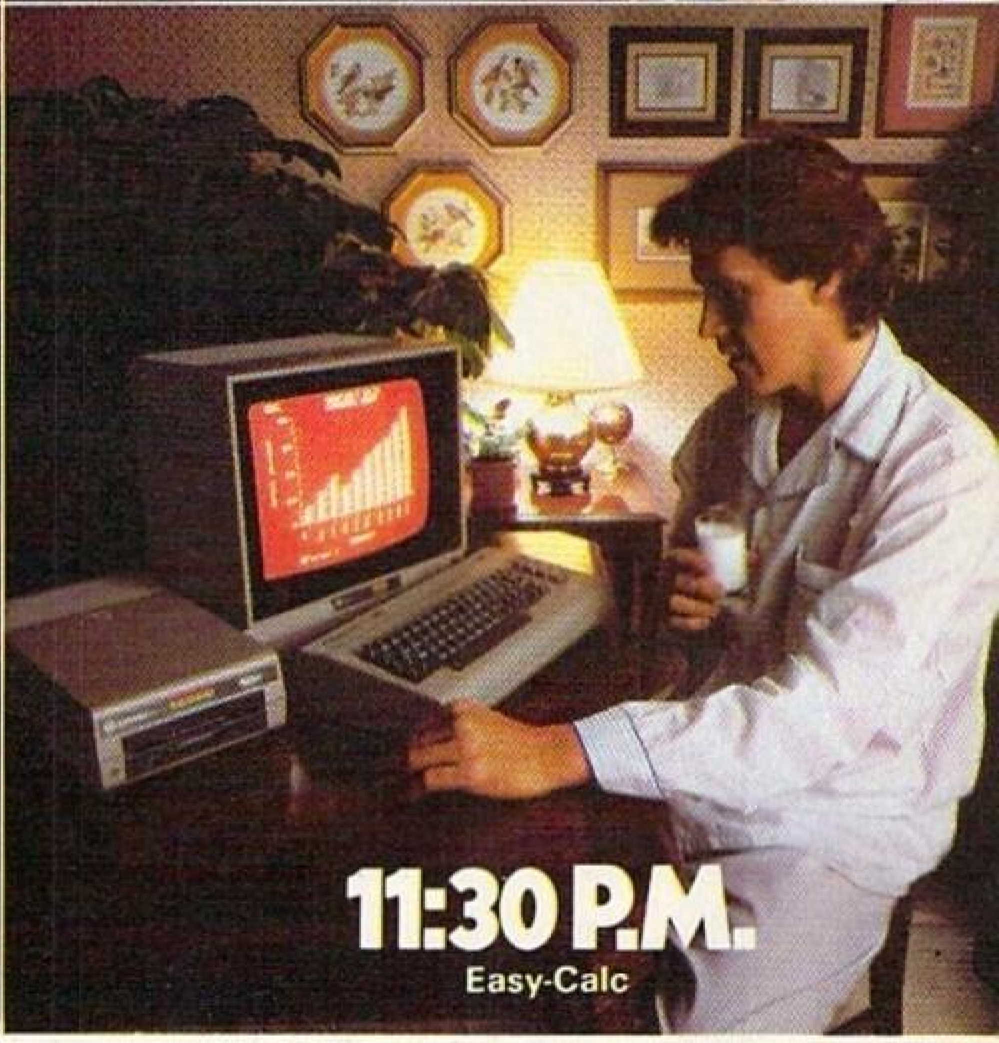
8:00 A.M.
Viduzzles



11:00 A.M.
Micro Cookbook



6:00 P.M.
Visible Solar System



11:30 P.M.
Easy-Calc

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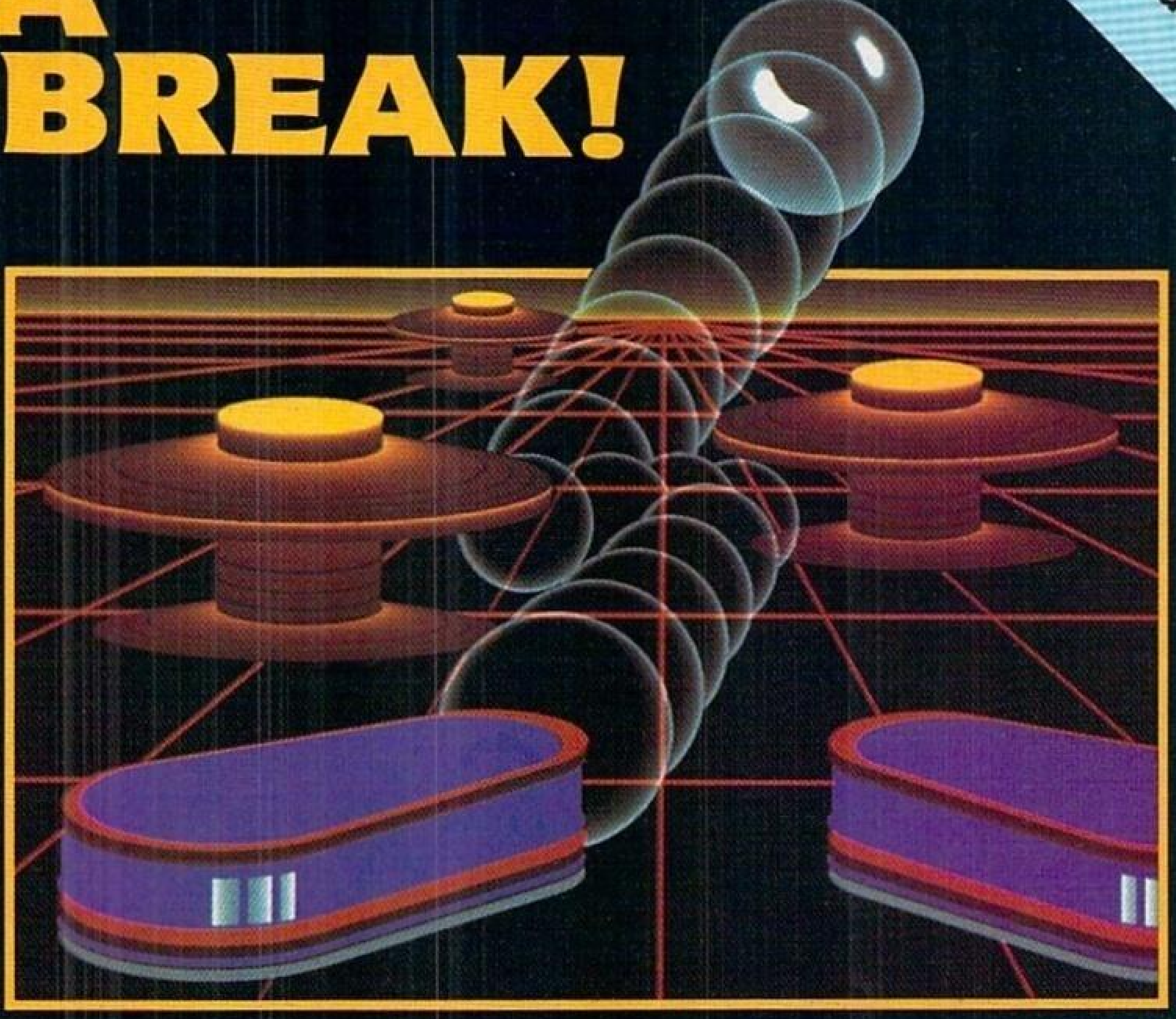

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commodore
VOLUME 4, NUMBER 2, ISSUE 14
APRIL/MAY 1985

power play

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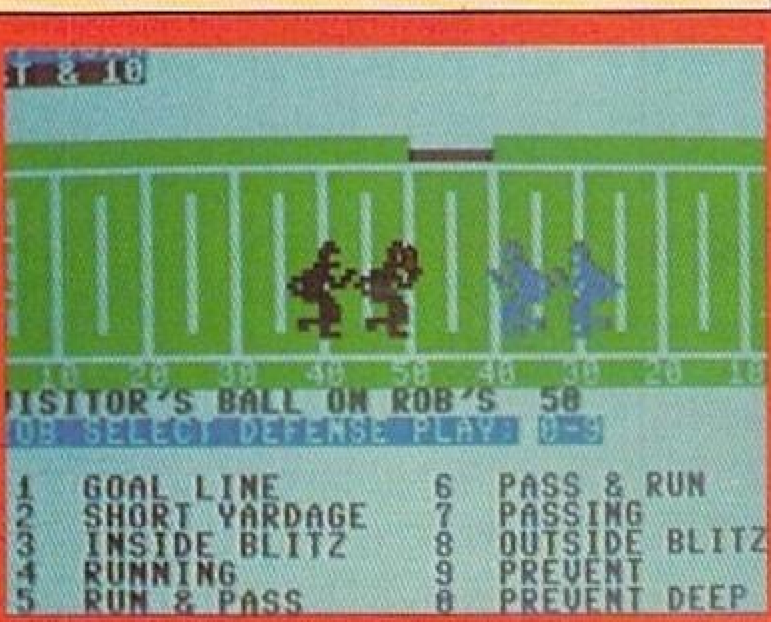

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WE'RE GLAD YOU ASKED

Our Users' Most Asked Questions

Q. Where can I get ribbons for my MPS-801 (or 1525/1526) printer?

A. The ribbon cartridges may be purchased from Commodore's service department by sending them a check or money order payable to Commodore Business Machines, at 1200 Wilson Drive, West Chester, PA 19380.

Q. I recently purchased my second 1541, and I want to change the device number on one of the drives so I can use them together.

A. To those who are mechanically inclined, this task is relatively simple. First, remove all power cords from the disk drive, then remove the drive's top outside casing (four bolts on bottom). You will now see the Printed Circuit Board (PCB) covered by a metal RF shield, remove the shield (two screws). To change the device number, two jumpers must be located. They look like screw heads and are about the size of a pencil eraser. The jumpers are silver in color and are flush with the PCB.

These jumpers will be located in one of two places depending on when your 1541 was produced:

1) Front left of PCB in front of board location C-46 (capacitor). Jumper is closest to you if the front of the drive is facing you.

2) Back left of PCB next to the 6522 chip, jumper number two is closest to if the front of the drive is facing you.

Use a pen knife or razor blade to scrape away the solder trace between the two halves. Jumper one should be cut to change the device to number nine. Cut jumper two to change to ten and cut one and two to change to an 11. Be sure to remove all solder particles from the PCB to avoid a possible short. Reassemble the drive.

Q. Can I buy a Commodore 64 here in the U.S. and use it abroad?

A. The answer to this is yes, if the country you are bringing the system to has the same electrical and television standards as the U.S. (120 volts/60 cycles and NTSC TV standard). If they are not the same, then Commodore does not recommend or support using the equipment in differing standards. Machines are manufactured overseas for differing standards. (For more detailed information on using your computer overseas, see *Commodore Microcomputers,* September/October 1984.)

Q. I can load programs from disk, but cannot save anything I've written.

A. All brand new disks must be formatted before using them. The procedure is listed on page 15 of the 1541 manual. It may be abbreviated as:

```
OPEN1,8,15,"N:DISKNAME,ID"
```

This action will erase all previous material stored on the disk, and set up a blank directory for the disk drive to follow.

Q. I am having trouble connecting to CompuServe with my VICmodem.

A. Make sure you have loaded the terminal software before trying to connect with the mainframe. Set your O-A switch to "O" for originate. If you are using a push button telephone, check to see if the buttons depress flush with the base. Phones that have a "light touch" (buttons do not depress) have high frequency filters in them which impede the incoming information flow. If you have a "light touch" phone or a phone where the dial is in the handset, we recommend you purchase a Commodore modem adapter. The modem adapter is available from Commodore's service department for $19.95.

Q. How do I find out what programs are on my disk?

A. There is a command built into the disk drive to display a listing of all the program names on a disk. The command is described on pages 10-11 of the 1541 manual. The command is:

```
LOAD"$",8
```

After the READY prompt returns, type LIST, and the directory will be displayed on the screen.

Q. Can I get service manuals for Commodore equipment?

Continued on pg. 6

POWERPLAY

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LETTERS

Ham Radio

To the Editor:

Just saw your request for information on uses of the Commodore computer and wondered if you have investigated the uses in amateur radio operating?

There are quite a few computers in the "ham" shack, lately, along with the radio gear. Some completely control the electronic gear, others keep log records and records of contacts with other stations during a contest and others help in the design of antennas and filter components.

As you can see, the uses are many and varied. I'll describe briefly two programs that I have now that will be used when I get my license and station back on the air. One is a sophisticated telegraph key, only much more. Not only can it key my transmitter in exact timing of the International Morse Code, but it also is a code practice machine, from one word-per minute to a lot faster than I could ever copy. It also gives me various selections of type of material I want to practice on. The function keys contain "canned" text messages and a number of other selections.

The other program gives distance from my home to any place in the world, the Great Circle bearing to that location and the reverse bearing. The selection of the distant point can be by either city or country, amateur radio call letter prefixes, or by latitude and longitude. Great Circle Bearings are used, because over any distance of a couple hundred miles, the radio wave follows a Great Circle Course and does not travel as the crow flies. It's like turning your TV antenna to get the best picture, only the ham turns a much bigger antenna but is still looking for best signal from the distant point. Both programs were for a VIC 20 and converted to the 64.

There are also radio computer nets that meet on certain frequencies at certain times and days, radiocommunicating instead of telecommunicating! Really, computers and amateur radio go hand-in-hand. It really adds a new dimension to the already great hobby of amateur radio.

Dale R. Weaver
Golden, Colorado

"Kids: Writing Up a Storm for Computer Publications!"

To the Editor:

I found the article "Kids: Writing Up a Storm for Computer Publications!" (October/November) most interesting. In fact, I find myself quite envious of what our kids are doing with computers.

Just two months ago, my wife bought a Commodore 64 for my 75th birthday and I haven't been the same since. The computer language in the manuals was most confusing at first, so I enrolled in a computer course in the Copper Mountain Campus of the College of the Desert. This proved to be very helpful.

For a number of years, I have been a writer and I'm thrilled with the benefits I enjoy using my Commodore 64. How wonderful to be able to pull out a line or a paragraph and change things around without retyping page after page—inserting a word or changing a word with a few simple key strokes. I'm sure you have realized these advantages for a long time, but it is so new and exciting to me!

Donald W. Rose
Yucca Valley, California

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YOU ASKED

Continued from pg. 4

A. Service manuals may be purchased through the mail from Commodore's service department. Most of them retail for $25.00.

Q. Where can I purchase inkers for my MPS-801 printer?

A. Inkers can be obtained from Commodore's service department for $3.00. The part number is 314569-01.

Q. How can I backup disks of my business software?

A. Backups for all application software can be purchased through Commodore's service department at a reduced cost. Contact Customer Support for prices and part numbers.

Q. Can I hook up a third-party monitor to my Commodore 64?

A. Yes, you can use third-party monitors as long as they are composite video. RGB monitors cannot be used with the 64.

Q. How do I format a disk on Commodore's 1541 disk drive?

A. First you have to type in OPEN-15,8,15,"NO:NAME,ID":CLOSE 15 and press RETURN. The name of the disk is limited to 16 characters and the id is two characters. Each disk should have a unique id.

Q. Can you expand the memory of the Commodore 64?

A. Commodore has not produced an expander for the 64 and there are no plans for one.

Q. Can you expand the screen display of the Commodore 64 from 40 columns to 80 columns?

A. Commodore doesn't make such an expander, but several different 80-column expanders are available from third-party manufacturers. Check your local computer store and read the ads in Commodore's magazines to find out what's available.

Q. How can I find out what files are on my Commodore 64 disks?

A. To find out what files are on a disk you must view the disk directory. To do so, type LOAD"$",8 and press RETURN. Then type LIST and press RETURN. The directory will appear on your screen, showing the titles of all files on that disk.

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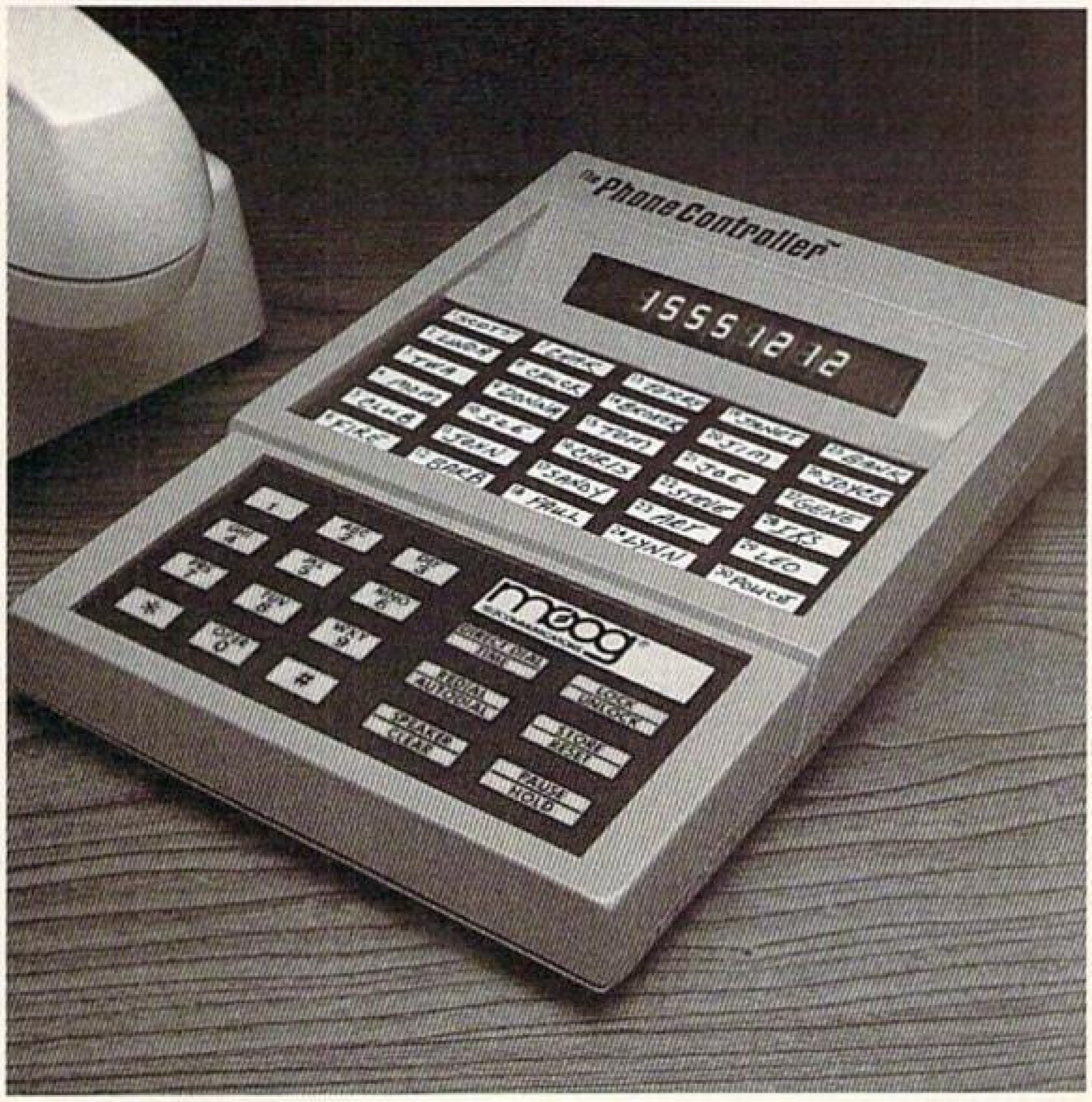

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BY JIM BUTTERFIELD

The Impossible Program

If you understand how your computer's system of representing keywords by "tokens" works, you can create impossible programs. It's just for fun: apart from the insight you get into the workings of your computer, the program won't do anything new or run any faster.

DO NOT try to type Listing 1 into your computer. It's nonsense. It won't work.

The program in Listing 1 makes no sense. If you enter it, it won't run. But you can create the program in a way that will make it work quite well. It will be tough to list, but it will run.

> *Some people like to write "clever" programs. This is certainly one to baffle your friends. But sometimes you'll get caught with tricks like this. Nevertheless, it does give you an insight into the inner workings of the computer.*

Creating It

Enter the program in Listing 2. Try to keep the spaces exactly as shown. This program will run correctly. When it asks, PRIMES UP TO WHAT VALUE? reply with 100 and you should see the primes printed out. It isn't the most efficient prime-finding program, but it works.

Now let's trim it so that it reads like the original program.

Fixing It

We're going to change Listing 2 as it lies in memory. If you have a Commodore 64, VIC 20, Commodore 16 or Plus/4, type:

```
A=PEEK(43)+PEEK(44)*256 :
B=PEEK(45)+PEEK(46)*256
```

On the other hand, if you have a PET/CBM, type:

```
A=PEEK(40)+PEEK(41)*256 :
B=PEEK(42)+PEEK(43)*256
```

In either case, type it in as a direct statement. This gives us the start and end addresses of the BASIC program. To check that we have the correct values, type:

```
PRINT B-A
```

You should get a value near 192, the size of the program. Exactly 192 means that you have typed it in exactly. Higher or lower indicates that you have added or deleted spaces, which is not serious.

Now let's find all those appearances of the letter W in NWXT. Type the following direct line:

```
FOR J=A TO B:PRINT
(PEEK(J)=87)*J;:NEXT J
```

When you press RETURN, you'll get a whole bunch of zeros, plus a few negative numbers. These are the locations where the letter W (ASCII code 87) appears in the program. Ignore the signs. I get the following addresses on my 64:

```
2068 2115 2146 2164 2224 2235
```

The first occurrence is the letter W in the prompt message, so we don't need to change that. The others we'll change with POKE statements to put the letter E in there. Thus, on my 64, I'll type:

```
POKE 2115,69:POKE 2146,69:POKE
2164,69:POKE 2224,69:POKE 2235,69
```

If you have done this correctly—be sure to use the correct addresses for your machine—your program listing will now look like Listing 3. Note that NWXT has been changed to NEXT. But it's not a *real* NEXT statement, since it isn't held within the computer's memory as a "token." Instead, this NEXT is just an ordinary variable. You can't see the difference when you list the program, but the computer holds two types of NEXT in a completely different format.

Don't run this program; or if you must, be sure to repeat the above commands which give values to A and B before you proceed. Running the program will destroy previous variable names, of course, and A and B will disappear.

Now let's look for the V and change it to an S. Our loop is typed as follows:

```
FOR J=A TO B:PRINT
(PEEK(J)=86)*J;:NEXT J
```

On my Commodore 64, I get three occurrences: at 2073, 2098, and 2121. The first is in the word VALUE of the prompt line, so we'll ignore it. Enter the pokes to change the letter V (ASCII 86) into an S (ASCII 83). On my machine:

```
POKE 2098,83:POKE 2121,83
```

Again, don't run it. We have one more job to do. Note that line 130 now lists as the impossible FOR NEXT = STOP STEP 2. But the computer knows that NEXT is a variable, not a keyword, and that STOP really means S TO P.

Last changes: we must search for the Y (ASCII 89) of FYR with:

```
FOR J=A TO B:PRINT
(PEEK(J)=89)*J;:NEXT J
```

On my machine, I change them to letter O (ASCII 79) with:

```
POKE 2159,79:POKE 2179,79:POKE
2185,79:POKE 2203,79
```

Finally, we search for Z (ASCII 90) with:

```
FOR J=A TO B:PRINT
(PEEK(J)=90)*J;:NEXT J
```

On my Commodore 64, I change them to letter I (ASCII 73) with:

```
POKE 2103,73:POKE 2141,73
```

Why couldn't we have typed in variable PIN in the first place? It doesn't seem to conflict with any existing keyword. The problem lies in PINTO. We mean to say, FOR EST =PIN TO . . . but the computer will also find the keyword INT within PINTO and become confused.

If you have made all the changes correctly, you'll now have the impossible program printed at the start of this article. You could not have entered it directly, since the BASIC editor could not have distinguished between intended variables and keywords. You don't even dare place the cursor over one of these lines and press RETURN—this would reenter the line and replace good code with bad. You may, of course, save the

Continued on pg. 127

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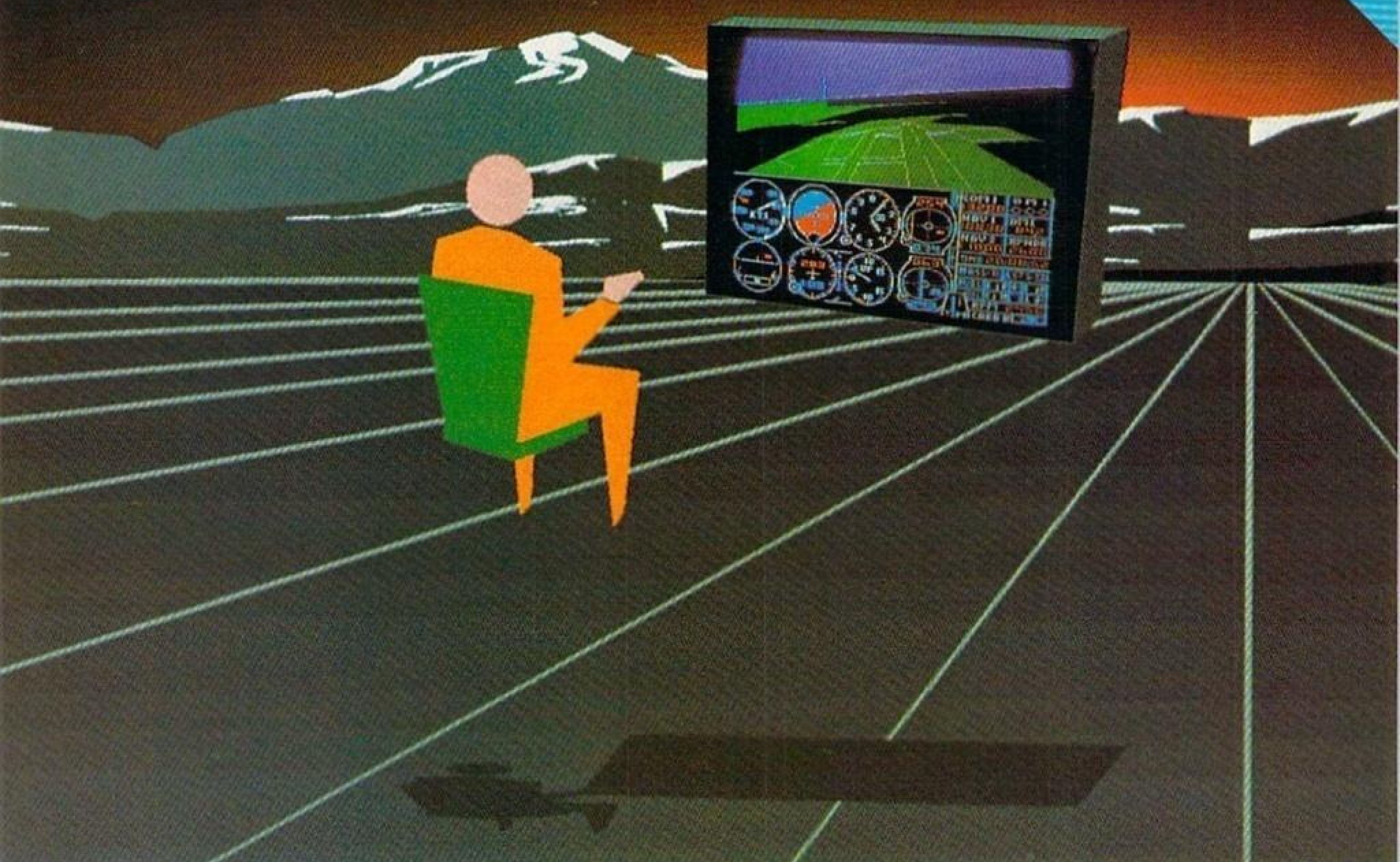
Flight Simulator II

For Commodore 64™ Computers



Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

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JOYSTICK LUNATIC

BY STEVE FINKEL

The Joystick Aptitude Test (JAT)

Tests are a part of our daily lives. In school, there are always tests to take. To get into college, you have to take the Scholastic Aptitude Test (SAT). To get a job, you may have to take a bettery of tests. Sometimes it's a test just to get up in the morning. Well, here is yet another test that can help you measure your gaming skills to give you an idea of where you really stand when it comes to sticking.

The test is broken down into five parts, each part relevant to a different area of irrelevance:

Part I: Logical Relationships
Part II: Math
Part III: True/False
Part IV: Reading Comprehension
Part V: Merely Annoying

Part I: Logical Relationships

1. **Base** is to **Joystick** as:
   a) Base is to Marines
   b) The Magic Carrot is to Uncle Wiggly
   c) Atlas is to Earth
   d) Much as you want it to be

The time limit on this test is approximately two months, or until the next issue of *Power/Play*.

2. **Firebutton** is to **Aliens** as:
   a) Coat Button is to Aliens
   b) Snap is to Crackle and Pop
   c) Bull is to China Shop
   d) If it really mattered
3. **Bonus Round** is to **Outstanding Play** as:
   a) Ground Round is to Hamburger Helper
   b) Plastic Metropolis is to Godzilla
   c) Penny Earned is to Penny Saved
   d) The world turns
4. **Explosion** is to **Sound Effects** as:
   a) Explosion is to Terrorist
   b) The Man Who Wears the Star is to Your Car
   c) Bird of a Feather is to Flock Together
   d) Often as possible

Part II: Math

1. If a joystick wears out after 65,000 firebutton presses, and the average number of presses per game is 125, and it takes you two dozen games **after** the joystick is actually spent to completely give up on it (you know how you keep playing with a bad joystick for a while hoping that it will magically recover by the force of your willpower), how many actual games will it take before you rip the joystick out of the computer joystick port and hurl it to the floor?
   a) 544 games
   b) 2 **really bad** games
   c) 3½ hours
   d) 1 text adventure
2. If there are four saucers bearing down on your third rocket launcher and you've earned one bonus ship per every twenty thousand points, if you are capable of hitting two saucers with each shot, what time is it?
   a) Time to give your little brother a chance
   b) Time to give up
   c) 4:57 PM
   d) Miller Time

Part III: True/False

1. **T** or **F:** When you are approaching an all-time high score on your favorite game, if you glance at your score you will lose a man.
2. **T** or **F:** The 1985 AMA Convention officially recognized "joystick thumb," the striation of the muscle tissue attached to the thumb ligaments, as the "tennis elbow of the eighties."
3. **T** or **F:** The SID chip is capable of simulating the sound of one hand clapping.
4. **Maybe** or **Maybe Not:** If there were a professional videogaming competition, the winners would receive a phone call from the White House. Collect.

Part IV: Reading Comprehension

Instructions: Read these paragraphs and muddle through the questions.

Stalking the Commodore key is not a task for the squeamish or weakhearted. It takes a sharp eye and a keen sense of direction to track it down. Once you've picked up its trail, you'll feel the steel tighten in your gut, knowing that you've entered a real struggle: it's either you or the Commodore key.

You track it relentlessly, over the gruff and unyielding numeric keypad, around the oblong keys that lie in wait on the right face of the keyboard, through the myriad letter keys, each trying to divert or waylay you.

But you come into a clearing in the lower left of the keyboard. . . and there it is, the C with wings! Warily, you approach, careful not to set those wings to flapping. You steady your hand for an all-or-nothing assault, ready to flee but refusing the yield to that unseemly impulse. A quick check of your gunbelt, and you are ready to proceed. . .

1. This paragraph is about:
   a) 139 words
   b) The macho challenge of pressing the Commodore key
   c) A new breed of computerist with serious mental problems
   d) To make you throw up
2. The best title for this paragraph might be:
   a) To Key a Mockingbird
   b) The Old Man and the Key
   c) Bridge on the River Key
   d) Those titles all stink!
3. Which of the following did **not** present an obstacle?:
   a) Numeric keypad
   b) Oblong keys
   c) Letter keys
   d) Uncle Wiggly

Part V: Merely Annoying

1. There is only one way to win, and that's to ________________ (concentrate/practice/cheat).
2. An important quality in a great gamer is a winning ____________ (smile/style/lottery ticket).
3. When considering a disk drive, a gamer looks for a unit that can be used ________________ (easily/reliably/as a toaster oven).
4. The greatest problem facing gamers today is a shortage of ____ (outstanding games/top-notch joysticks/breath).

TIME to throw in the towel.

SCORING: After you've puzzled over all the questions and sweated out all the answers, it is easy to evaluate your own true level of Joystick Aptitude. Place the test next to your computer, pick up the joystick and play a game. Your game score will provide you with a true measure of your Joystick Aptitude.

PlayNET announces 19 exciting ways to bring people together.

Now there's a Home Computer Network that lets you communicate with all kinds of people—all over the country! Make new friends, play exciting games, barter—shop—trade, all from the comfort of your home.

The network operates 6PM–7AM every weeknight, and 24 hours on Saturday, Sunday and Holidays. All you need to access PlayNET™ is a COMMODORE 64,* DISK DRIVE and MODEM.

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You can *send private messages* to people on the system, and the message will be waiting when they sign on!

3 **BULLETIN BOARDS.**
You can *post announcements*, or check the listings of other members. There are lots of boards for hobbies and special interests! If you don't find the one you're looking for—create your own!

FOR SALE
PLAYNET
BULLETIN BOARDS
CLUB NEWS

4 **FILE TRANSFER.**
You can even *transfer non-commercial programs* to other members! There is a small extra fee for this service.

ELECTRONIC
FILE
TRANSFER

5-17 **GAMES! GAMES! GAMES!**
PlayNET lets you play exciting games with real people, not just a computer. All our games have *full color* graphics, and they're all *interactive!*

- Plus the added feature of being able to talk with your opponent while you play. Discuss strategy, comment on moves, even try and psych your opponent out!
- New games are added all the time, and there are tournaments for every skill level.

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- Four-In-A-Row
- Go
- Hangman
- Quad 64™
- Reversi
- Sea Strike™

18 **MORE! MORE! MORE!**
There's *on-line updating* of your PlayNET Software as games and services are added. You have access to PlayNET's *Shopping Center* and *Information Center*, and every month you'll get our *Newsletter*.

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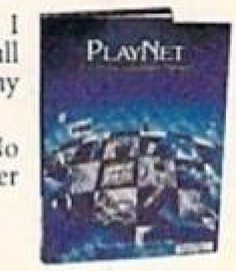

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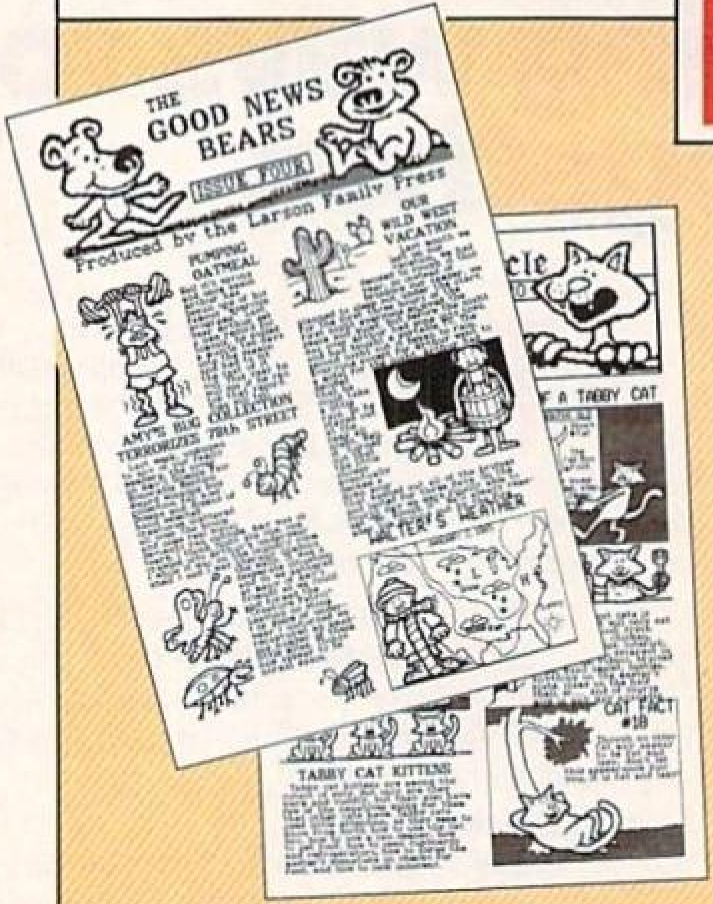

THE GOOD NEWS BEARS

ISSUE FOUR

Produced by the Larson Family Press

Produce Your Own Newspaper

Now an educational program is available that allows journalists of all ages to compose and print out a realistic newspaper, complete with masthead, headlines, articles and even art. The program for the Commodore 64 is **The Newsroom** by Springboard Software (7807 Creekridge Circle, Minneapolis, Minnesota 55435).

The Newsroom lets you create a realistic newspaper, generated from a library of more than 600 pieces of art and layout options. Alter existing artwork or create your own, or if you have a modem, send and receive text and even pictures between previously incompatible computers.

The program package includes a 90-page booklet which teaches you the basic components of producing a newspaper. The booklet also contains an annotated bibliography.

Create Your Own Adventures

Electronic Arts (2755 Campus Drive, San Mateo, California 94403) has introduced **Adventure Construction Set**, a software package for the Commodore 64 that allows a player to design graphic and text adventures that may be played by one to four players.

Adventure Construction Set actually contains three products on a single double-sided diskette: **Adventure Construction Set**, **Rivers of Light**, an adventure set in Egypt and the Near East, and **Land of Aventuria**, a tutorial for novices which contains seven mini-adventures. These mini-adventures, as well as **Rivers of Light**, may be modified by the player to help learn how to build adventures with **Adventures Construction Set**.

While it can be used to build any game, three different kinds of adventure formats are provided: fantasy and medieval, spies and mysteries, and science fiction adventures. The program supplies a set of graphics, objects, and terrains for each kind of adventure. It can handle more than 250 different locations, 500 unique creatures and characters, and 5,000 or more treasures, magic items, doors, walls, furniture pieces, weapons, sound effects, musical themes and other props.

Adventure Construction Set has a suggested retail price of $50.00.

Bible Trivia

Trivia buffs will be able to test their knowledge of the Old and New Testaments with the introduction of the Bible Edition of **PQ-The Party Game** for the Commodore 64 from Suncom (260 Holbrook Drive, Wheeling, Illinois 60090).

The 2,700 questions in the Bible software package were authored by Father John Massion of St. Isaac Joques Catholic Church in Niles, Illinois. Questions cover the history, geography, psalms, proverbs, parables, kings, people, places and events of the Bible.

Suggested retail price is $24.95.

Animation Station
Spellbound
Animation Station
Shape Library 1
PQ Entertainment Edition 1
PQ Education Edition 1
PQ Bible Edition 1
PQ Sports Edition 1
PQ General Edition 2
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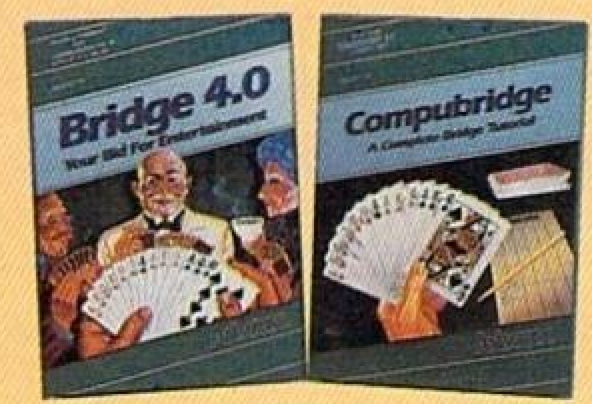

Learn Bridge on Your 64

Artworx Software (150 North Main Street, Fairport, New York 14450) has released an aid to learning bridge. **Compubridge** for the Commodore 64 has ten chapters of text and eight corresponding quiz sections. The computer will randomly generate an unlimited number of practice hands corresponding to the different chapters. As you play, **Compubridge** will evaluate your actions, correcting mistakes or weak moves by suggesting alternative strategies. Coupled with Artworx's **Bridge 4.0**, these programs can be used by experts and novices alike. Both programs have a suggested retail price of $24.95.

Fast Access to the Commodore 64

Muse (347 N. Charles Street, Baltimore, Maryland 21201) has released **Smart Start**, a program for the Commodore 64 which makes the complexities of writing, saving, loading and running a program a simple matter of moving a cursor and pushing a button. It is almost entirely menu-driven, enabling even novice users to design and save intricate pictures, music and sound effects programs right away.

Smart Start generates appropriate BASIC code automatically so the user can enjoy the accomplishment of designing a program without the drudgery of calculating and entering countless data lines. In essence, it is for people who don't want to study lengthy owner's and programmer's manuals.

Smart Start is designed for the 64 with the 1541 disk drive. Joystick and printer are optional. Suggested retail price is $39.95.

Music Aid for the Commodore 64

Synchronicity Software (P.O. Box 1578, Spring Valley, California 92077) has released Piano-Eze, an easy-to-use template for use with Commodore's **Music Machine** software for the 64. The template resembles a piano keyboard and rests on your Commodore keyboard for quick reference. The removable template is made of durable plastic and retails for $5.95.

Hitchhiker's Guide to the Galaxy Software Available

Author Douglas Adams (left) and programmer Steve Meretzky collaborated to produce the computer version of *Hitchhiker's Guide to the Galaxy.*

Infocom (55 Wheeler Street, Cambridge, Massachusetts 02138) has paired author Douglas Adams (**Hitchhiker's Guide to the Galaxy**) and programmer Steve Meretzky (**Planetfall**) to produce their latest piece of interactive fiction for the Commodore 64, also titled **Hitchhiker's Guide to the Galaxy**.

You, as leading character Arthur Dent, wake one morning to find your house in the path of bulldozers clearing the way for a new highway. Unknown to you, there are larger destruction plans brewing—those for the demolition of the entire planet. But your friend Ford Prefect, who (unknown to you) happens to be from the star Betelguese, has a means of escape in the form of an Electronic Thumb. With the Electronic Thumb, you and Ford can hitchhike a ride on any passing spaceship. And that's just what you do.

Up to this point, the story line of the game is similar to that of Adams' book. But once aboard the Vogon flagship, you'll find characters and locations created by Douglas Adams exclusively for Infocom.

The program retails for $39.95.

(For more on Douglas Adams, see Dan Gutman's article in this issue.)

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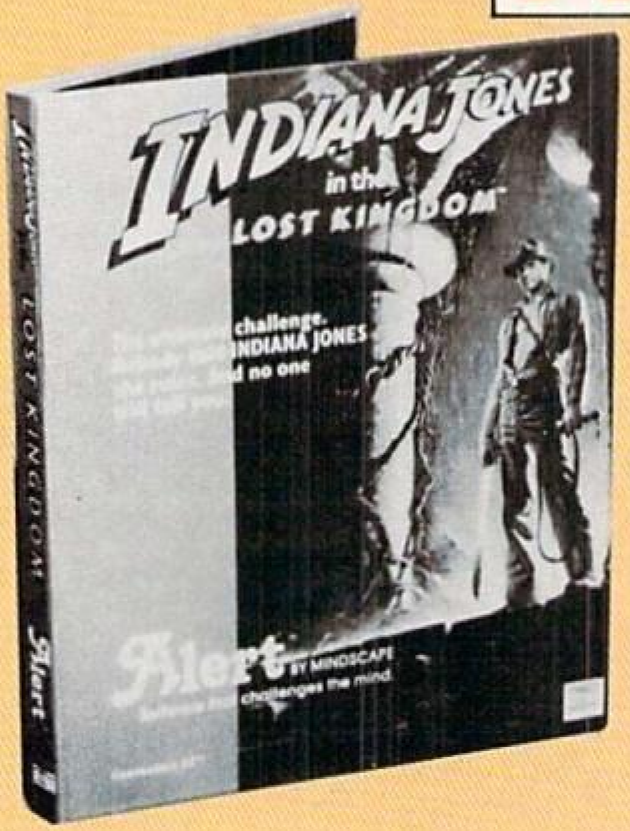

Help for Poor Spellers

Cross Educational Software (1802 N. Trenton Street, P.O. Box 1536, Ruston, Louisiana 71270) has released a Commodore 64 spelling program for older students and adults called **Spell-a-Vision**.

Just as most people are right-handed, so most people have visual memories for spelling words. Some, however, have auditory memories in which they "hear" spelling words in their minds and spell them like they "hear" them. This makes them poor spellers for life. **Spell-a-Vision** is designed to help people with auditory memories develop visual memory so they "see" spelling words in their minds.

Spell-a-Vision is an independent study program requiring no teacher or parent guidance. Each of its 8,000 words has a sentence which communicates the word's meaning. Although each disk is independent, the same characters appear throughout the series.

There are eight volumes which retail for $19.95 each or $150 for the complete set.

Indiana Jones Clue Hotline

The legendary adventurer Indiana Jones is trapped—and so are you. There is no way out. That is, unless you happen to be playing Mindscape's (3444 Dundee Road, Northbrook, Illinois 60062) **Indiana Jones in the Lost Kingdom**, where there is just one last alternative—the clue hotline. The clue hotline enables players to directly access a microcomputer by phone for clues to help solve the mysteries of the program.

Mindscape has created this special telephone hotline specifically for rescuing frustrated players in need of clues to escape any of six treacherous chambers. Since **Indiana Jones in the Lost Kingdom** provides no specific rules for play, the program requires players to rely on their own intuition, logic and skill to escape each room. However, when a player becomes completely baffled, the clue hotline is available for assistance.

The clue hotline computer can be reached by dialing 312-480-5010, 24 hours a day, for callers with a modem. Other callers will require the assistance of a Mindscape operator at 312-480-7667 during business hours.

History and Geography Trivia

Roll Call USA, a program that has combined history and geography facts into a question-and-answer game that challenges your knowledge of the 50 states, has been released by Creative Software (230 East Caribbean Drive, Sunnyvale, California 94089) for the Commodore 64.

A game for one to four players, **Roll Call USA** uses a map of the United States as a guide and will tell you if you have misspelled the answer or give you the right answer should you need it.

The game retails for $14.95.

Designer's Pencil Contest

Activision (2350 Bayshore Frontage Road, Mountain View, California 94043) is offering $10,000 in cash and prizes for the 20 best programs created with their **Designer's Pencil**.

Entrants are instructed to send a floppy disk or cassette containing their program and will be judged in two categories: short program (30 commands or less) or open (more than 30 commands). There will be four grand prizes of $1,000, eight $500 second prizes, and eight Okidata printers awarded to third place winners. Deadline for entries is April 30, 1985.

Compatible with the Commodore 64, **Designer's Pencil** requires no artistic or computer programming experience. Contact Activision for contest rules and official entry form.

(A review of **Designer's Pencil** appears in this issue.)

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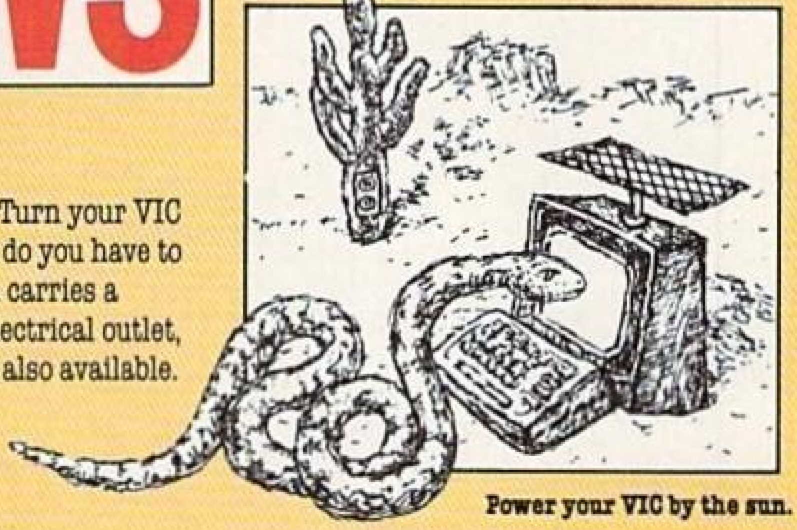
POWER PLAY'S NEWS FROM THE FRONT

April Fools SPECIAL

Solar VIC

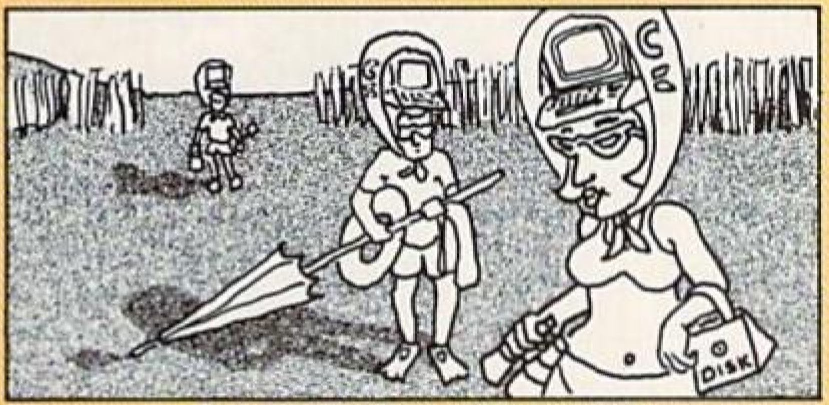
Trying to conserve energy? Sun City of Phoenix, Arizona, has the answer. Turn your VIC 20 into a solar-powered machine by adding one small peripheral. No longer do you have to worry about electrical sources when you use this innovative product which carries a satisfaction-guaranteed warrantee. And since you are no longer tied to an electrical outlet, you can now bring your VIC virtually anywhere! A Commodore 64 version is also available.



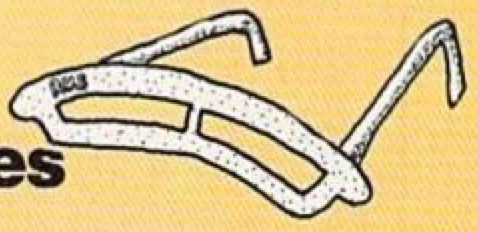
Power your VIC by the sun.

Portable Commodore 64

Commodore has released their latest peripheral for the 64 which turns your computer into a fully-functional portable computer. Made of sturdy canvas, this peripheral comes in three sizes to comfortably fit any user. A handy disk carrier is an added bonus. No longer are you confined to your home or office when you compute! Child sizes are also available.



Turn your 64 into a portable computer.

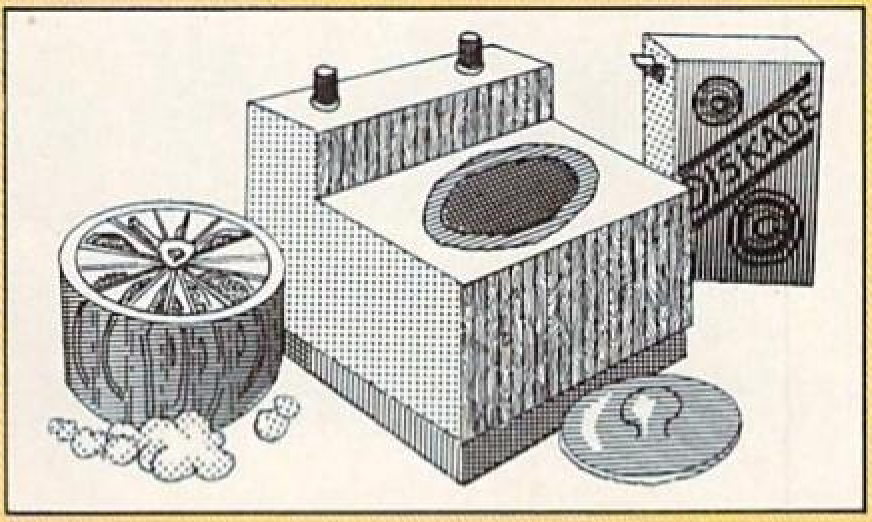


3-D Glasses

R. U. Seen, Inc., of Clearview, Michigan, has released their latest version of 3-D World, glasses for use with your computer. Not only can you now effectively reduce video screen glare by 100%, but you can experience three-dimensional computing. It's really out of this world!

Disk Washer

Westinghorse of Dallas, Texas, has introduced the latest in disk maintenance: the Disk Washer. No longer do you have to put up with dirty disks. Spill something on your disk? Throw it in the washer! The washer fits any standard floppy disks and even includes a compartment for cartridges and hard disks. A version is also available exclusively for Winchester disks. Diskade is included with every model and the unit is virtually maintenance free.

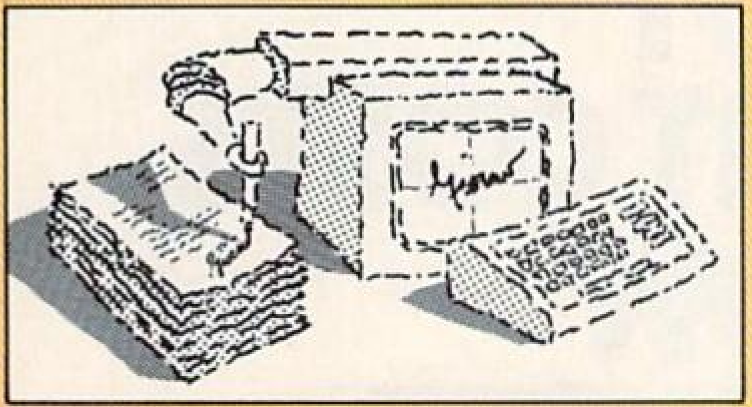


Keep your disks clean.

Help for Tired Hands

Innovative Products of Tibuktu, Ohio, has introduced a technological breakthrough with their latest release, Signature Forger. This revolutionary product is not only compatible with most personal computers, but is extremely user friendly.

Connection of the hardware to your computer is easy and you will be ready to begin in minutes. The only information needed to be entered is a sample signature. After that, the product does it all. No longer will you have to stay home on weekends because your hands are tired from signing documents, checks or letters! The price is extremely affordable and no desk should be without it.



Signature Forger signs paperwork.

Clean Screen

Contemporary Manufacturing of San Diego, California, has introduced Clean Screen, the latest in technology to keep video screens clean. Extremely easy to use, Clean Screen mounts directly onto your video screen within minutes. The lowest-priced cleaner on the market, Clean Screen periodically wipes your screen clean. No more grimey hands or messy screens! Cleanser is included.

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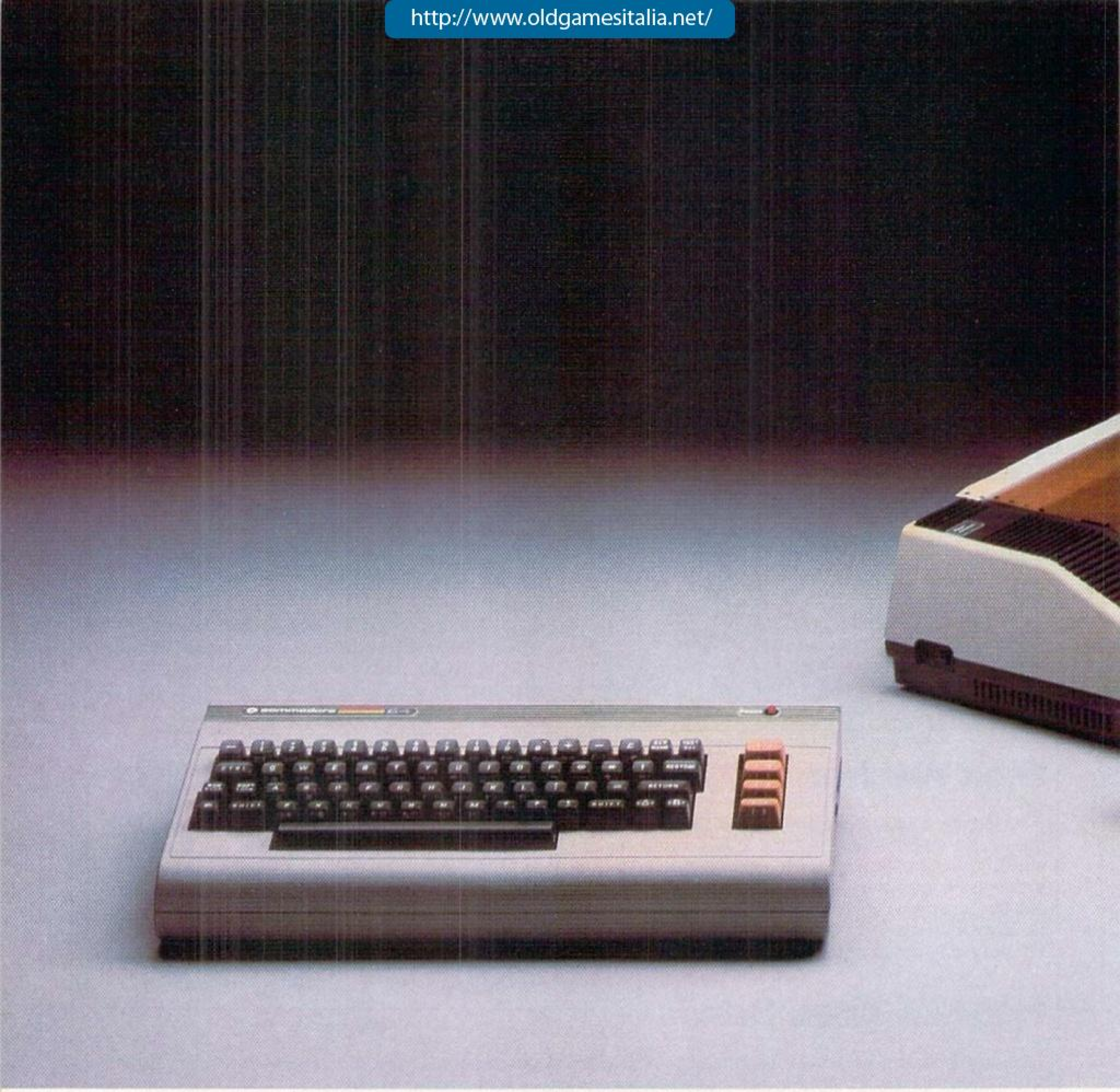

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We have a surprise for all those people who think that in order to get more you have to pay more.

The Commodore 64.™

We also have a surprise for all those people who think they have to settle for less just because they're paying less.

The Commodore 64.

The Commodore 64 has a full 64K memory, high fidelity sound and high resolution, 16-color sprite graphics.

It's fully capable of running thousands of programs for schools, business or funny business.

But the Commodore 64 is about one third the price of the 64K IBM PCjr™ or the Apple IIe.™ In fact, for about the price of those computers alone you can get the Commodore 64, a disk drive, a printer and a modem—a powerful computing system.

We don't do it with mirrors, we do it with chips. We make our own. So we can make them for less, more efficiently and more economically than people who don't. (Which is just about everybody else.)

So because it's a 64, it's powerful. Because it's a Commodore, it's affordable. And because it's a Commodore 64, it's the world's best selling computer.

COMMODORE 64

IT'S NOT HOW LITTLE IT COSTS,
IT'S HOW MUCH YOU GET.

REVIEWED BY TOM BENFORD

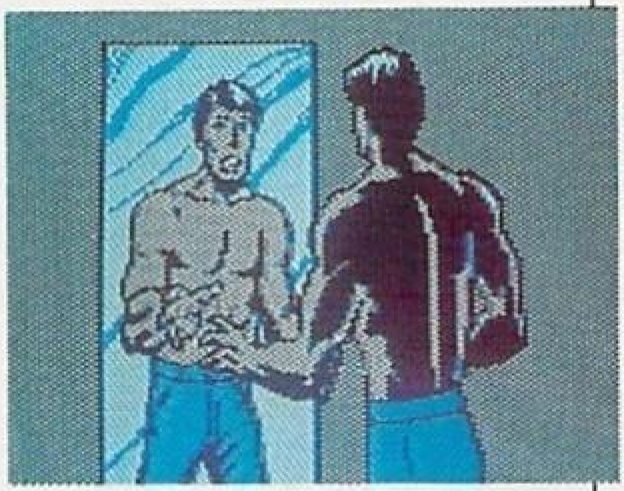
The Hulk

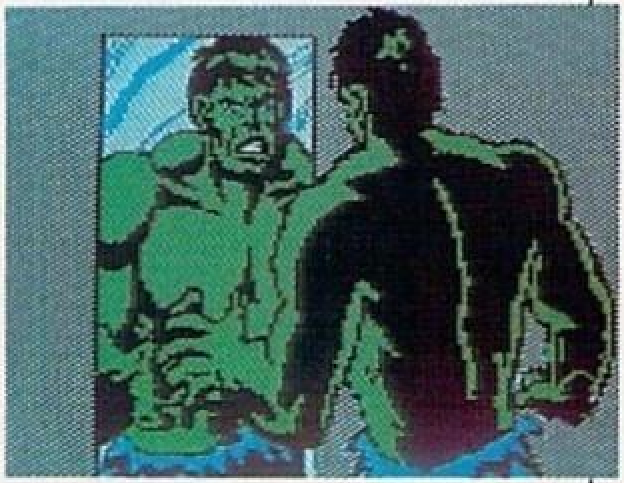
Computer: Commodore 64, Plus/4
Publisher: Commodore Business
Machines, Inc.
1200 Wilson Drive
West Chester, PA 19380
Medium: Disk

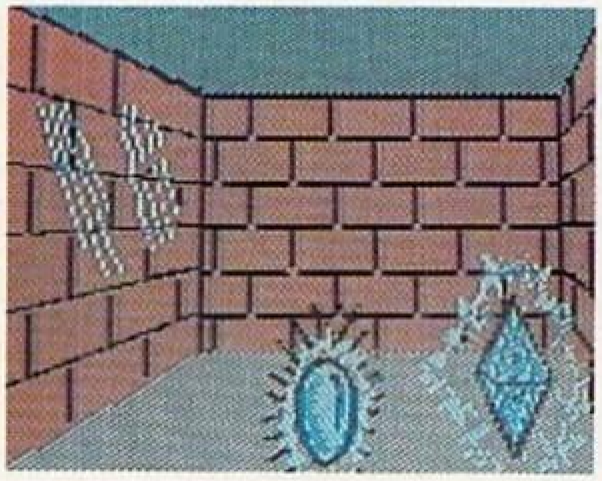
The Hulk is a graphic/text adventure that is the result of collaboration among game designer Scott Adams, Marvel comics and Commodore. It is sure to push your deductive reasoning powers to the limit. Gameplay is achieved through the keyboard, so you won't be needing your joysticks for this one. The uppermost portion of the screen displays an illustration depicting the "locale" of the current action, while the lower portion of the screen supplies the gamer with text. The text portion expounds on what is shown in the graphic display, and (more often than not) poses a dilemma. The gamer must then contemplate the situation and type in instructions to continue the game.

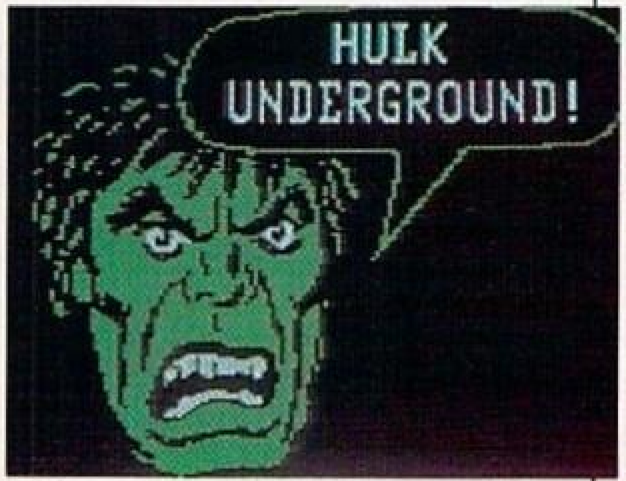
In this particular adventure, the gamer actually takes on the identity of the principal character. You may recall from reading Marvel comics that The Hulk is actually Bruce Banner, a brilliant physicist with something of a personality problem—an alter ego endowed with super-human strength and attributes. For those of you who aren't familiar with *The Hulk* from comic book land, I'll provide you with some biographical information.

> *Most of the situations you'll encounter can be solved with some thought and a little common sense. If you do get stuck (it happens to all of us sometimes), you can type in "help." The program* may *give you a hint as to what you can try, but then again, it may not!*









Dr. Robert Bruce Banner worked at a government research facility in New Mexico as a nuclear physicist. He was the designer and inventor of a new nuclear weapon for the U.S.—a new type of bomb that had an extremely high output of gamma radiation. After laboring for some time, he had the device ready for aboveground testing, and the countdown had started. From the instrumentation bunker at the test site, Banner observed a teenager who had inadvertantly wandered onto the test range. In an uncharacteristically brave moment, Banner ran from the bunker to save the civilian wanderer, throwing him to safety in a ditch. At precisely that moment, the gamma-bomb detonated, and Banner, surprisingly, wasn't killed. He was changed, however, in a most extraordinary way: the gamma radiation had altered his cellular makeup and caused multigenetic transformations in every molecule of his body. These resultant changes heralded the appearance of The Hulk for the first time.

There's no mistaking Banner for The Hulk—they're as opposite as night and day. Banner is a thin, intellectual, wimpish kind of guy who wears eyeglasses. His alter-ego, The Hulk, stands seven-feet tall, weighs 1,040 pounds, and he's green from head to foot (hair included)! Oh, but that's not all—he can lift over 90 tons, he can leap almost three miles, and his skin can withstand heat up to 3,000 degrees Fahrenheit and cold down to minus 190 degrees Fahrenheit! The Hulk can also see "astral" or ectoplasmatic forms. Quite a contrast from the meek Dr. Banner, wouldn't you say?

Banner's alter-ego makes his presence known anytime the good doctor is subject to an unsettling condition of his nervous system—stress, pain, fear and rage are all catalysts that trigger the transformation. These "green

REVIEWED BY FRANCIS AMATO

attacks" gradually subside, and The Hulk personality once again returns to the placid form of Dr. Banner.

Several "key" words are recognized by the game program, and they include: climb, drop, examine, enter, go, help, leave, light, look, move, pull, push, quit, read, save, say, take and hit. For the sake of convenience, the program will also recognize and acknowledge certain abbreviations, such as N, S, E, W, U, D, I and L, which stand for north, south, east, west, up, down, inventory and look, respectively. The software "understands" simple commands and they're all that are really necessary to play the game. An example of the command syntax would be "unlock door" rather than "unlock the door"—short and simple commands get the point across.

In the opening scene of the game, we see Banner tied up, and the text elucidates the graphic by telling us, "I'm Bruce Banner, tied hand and foot to a chair. What shall I do?" If you've been following along so far, then you know that the wimpish Dr. Banner isn't strong enough to break the ropes, but the Hulkster is! What to do here? I'll give you a hint: try entering "bite lip" and—sure enough—ol' green skin will make his entrance and break free of the ropes. From here on, though, you're on your own.

A nice feature of the game is the ability to save an adventure in progress for resumption at a later time. This comes in handy when you encounter a particularly sticky situation and you'd like to spend a little time mulling over it to come up with a solution. Most of the situations you'll encounter can be solved with some thought and a little common sense. If you do get stuck (it happens to all of us sometimes), you can type in "help." The program *may* give you a hint as to what you can try, but then again, it may not!

In summation, let me say that *The Hulk* is an impressive offering in what promises to be a sure-fire hit adventure series. If you're an experienced adventure game aficionado, *The Hulk* is a must-have. If you're new to this sort of gaming, it will make an excellent entry program into the world of adventure games.

Rug Rider

Computer: Commodore 64
Publisher: TriMicro
1010 N. Batavia,
Suite 6
Orange, CA 92667
Medium: Disk

In *Rug Rider* for the Commodore 64, you (and up to three others) play Ahmed, whose father has given him a magic carpet to explore the world.

First choose the screen you wish to play from a stylized map composed of 32 sections. Thirty-one of these sections show trees, mountains or castles. Each picture gives you a hint of the type of challenge. Trees are forests, mountains are usually caves, and castles are towns, buildings or rooms. The thirty-second section is a picture of a skull. That is where the evil genie lives, so avoid it.

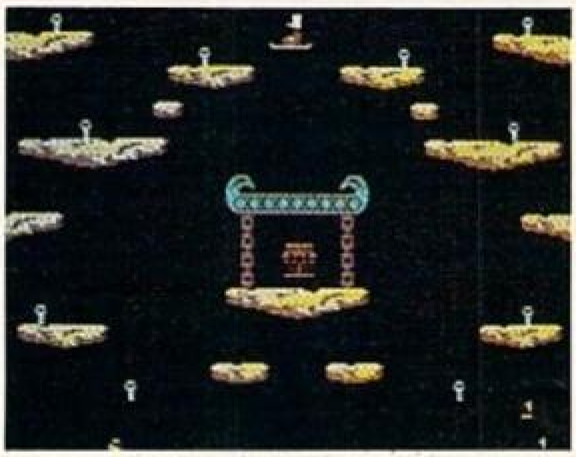
Using the joystick, move a box over the area you wish to visit. If the box is white you haven't been there before; if it's black, you've already been there and can't re-enter. Pressing the fire button loads the screen.

When the screen appears, the Rug Rider floats down and waits. Nothing happens until you move him. This acts as a pause feature, so take advantage of it. There is no turning back once you start.

You control (or try to control!) the Rug Rider with a joystick plugged into port two. This isn't easy. The figure is extremely maneuverable—in fact, almost too maneuverable. Adding to the difficulty is the fact that the rug bounces when it hits an obstacle. And bounces and bounces. This is definitely a game for joystick jockeys.

Depending on the area you're visiting, there will be different obstacles. The Rug Rider loses one of his five rugs if he collides with them. Scattered around the screen are keys and at the bottom of the screen is a box containing a treasure. After you gather the keys, the walls dissolve so you can collect the treasure. But you must then make it safely to the top of the screen to exit. In addition to the keys, there are other items that come in very handy, such as diamonds, magic shields and drills. Some of the screens also contain extra rugs.

This isn't easy. The figure is extremely maneuverable—in fact, almost too maneuverable.



Of course there are dangers. Life isn't easy for Rug Riders. Things drop down, thieves pop up, flying or hopping creatures appear, pits open, walls surround you, and demons or wizards fire magic bolts. The designer shows a great deal of ingenuity in creating these dangers. My favorite is the volcano, which blows out deadly puffs of smoke. Very creative and very nicely done.

The game has some nice touches. I especially like being able to save the top five scores. This is an often overlooked, but vital capability in an arcade-style game. We all like to brag or have a concrete goal to shoot for.

The only word to describe the graphics in this game is superb. The computer's sound abilities are fully exploited. The music is constant and well programmed. The F7 key will turn off the sound for the tone-deaf or late-night gamers.

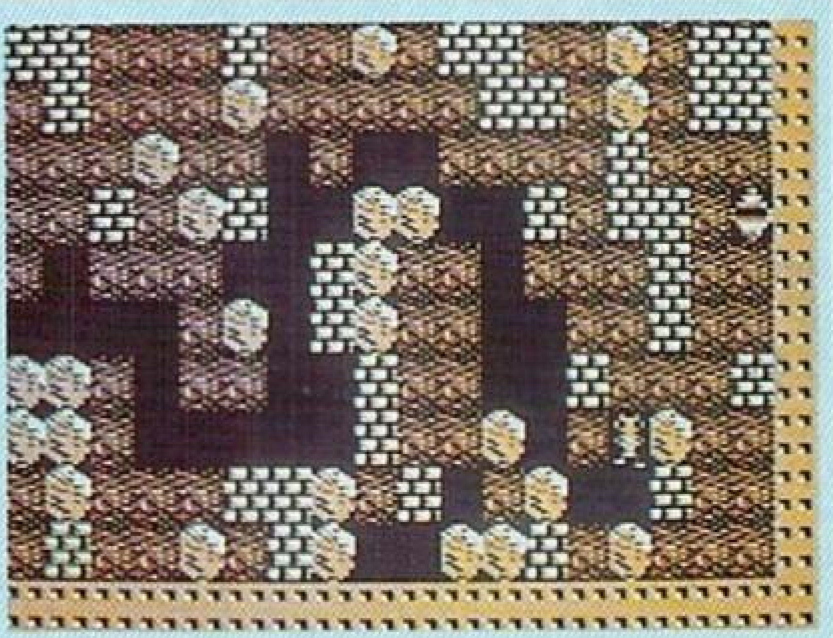
Rug Rider is an easy game to play, but a hard one to master. There are four levels, each being a magnitude more difficult than the one before. Even the beginner's level is a bit too hard for me.

Rug Rider is definitely a challenge. It gives the hard-core game player as much action and thrills as he or she could possibly want.

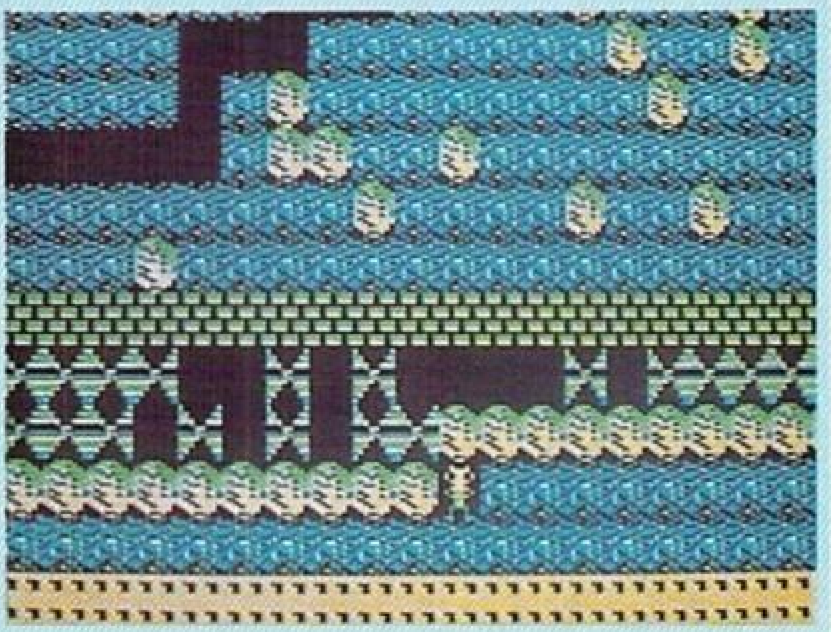
REVIEWED BY MARK COTONE

Boulder Dash

Computer: Commodore 64
Publisher: Micro Fun
2699 Skokie Valley Road
Highland Park, IL 60035
Medium: Disk



Each lair is varied enough to require some creative problem solving.



In Micro Fun's *Boulder Dash*, the objective is straightforward. You must move Rockford, an unpretentious miner, underground, unearth jewels, and escape the cave within a time limit.

Viewing your character as you would an insect in a glass-sided ant farm, you control his digging with the joystick. Everything down there adheres to the physical laws of gravity. Remove the soil from under a boulder and the boulder will fall until it reaches another solid ledge. Sometimes this movement is harmless, while other times you may instigate an avalanche. Just move cautiously, keeping an eye out for treasure, and avoid being crushed by falling debris.

As you play, you develop more intricate points and strategies, but these simple instructions are all you need to begin. Ah, I know what you're thinking. Anything that simple to learn will be just as easy to forget. After all, a mastered game is soon discarded, isn't it?

Don't be fooled. Just because the orientation period is uninvolved, don't think you're in for a cake walk. With each new cave Rockford enters, a new scooping skill must be evolved. The player will never be overwhelmed by the mining tasks he must perform, but each lair is varied enough to require some creative problem solving.

The pacing will let you start at a crawl, but, as the name implies, you will soon be required to dash. The earlier rounds are designed to bait you. Once you're hooked, get ready for a relentless challenge encompassing five levels with 16 caverns each.

There's nothing like a little novelty to keep a game interesting, and *Boulder Dash* is unique in two areas. First, it has playable intermissions. After every fourth cave, the player is entitled to earn an extra life by completing a short interactive puzzle. There's no penalty for failing to solve the enigma, only a chance for a bonus.

Also, designer Peter Liepa shows a little bit of mercy by incorporating some useful alter-egos in each obstacle. Butterflies, fireflies and amoeba are not only Rockford's nemeses, but also his allies. For instance, when a deadly firefly is crushed by a falling stone, he explodes, demolishing all nearby objects. This can be helpful when you are confronted by an impenetrable wall. The blast can give you easy access to the treasures beyond.

Butterflies, on the other hand, turn to valuable diamonds when bopped by a boulder—priceless assistance when trying to reach your quota. Finally, an amoeba, an uncontrollable growth which has a strong tendency to overcrowd a cavern, can be surrounded, suffocated, and turned to your advantage.

I don't want to turn off any macho excavaters by calling Rockford "cute," but how else would you describe an on-screen character who, when I paused momentarily to contemplate my next move, turned toward me, blinked his owl eyes repeatedly, and, with hands on hips, started tapping his foot impatiently.

The caves also have names corresponding to their unique features and pitfalls. This adds a nice dimension to the game play, because each new round has its own individuality.

It is also the attention to details that usually determines whether or not a program will be successful. Even a well conceived piece of software will fail if it is presented sloppily. I am happy to note that this is not the case with *Boulder Dash*.

The game elements, audio backdrop, sound effects, instruction booklet and packaging are all carefuly done, and the result is enjoyable computer entertainment for the whole family. There's enough fast-paced strategic action to keep you digging this game for months. C

On a Dasher's Dawn

Aid for Rockford Recruits

The instruction booklet for *Boulder Dash* is chock full of ideas aimed at helping the player, not only in the early going, but through the more advanced caves as well. Take note of those tips; they will save you plenty of time and frustration.

In addition, I've come up with a few more hints that may preserve your rookie digger a little longer. The letters after each suggestion refer to the caves in which this strategy might be employed.

* In caves where the object is to collect a motherlode of jewels, always start from the bottom of your field, moving skyward. Due to gravity, all rocks fall down. Although this sounds obvious, many players wait too long and the lower portion of the screen becomes impassable due to boulder build-up. (C,I,K)

*When surrounding an amoeba, you want to leave a space open as an access route to the jewels. Since Rockford is not affected by the green growth, position him, instead of a stone, as part of the wall. Then, after the metamorphosis has taken place, the treasures will be obtainable. (G)

*One sure fire way of turning the tables on an attacker is to tunnel straight up until you have a boulder positioned directly above your head. Then, as the opponent approaches, step aside and let the two objects resolve their meeting. (D,F,N,P)

*Knowing the movement of the subterranean insects is helpful when stones are not around to aid. After noting how the buggers move, you can form passageways which your antagonists will follow, regardless of your positioning. (E,J)

*You should pay attention to the fact that all caves are set up the same way each time the game is played. Therefore, patterns can be developed and used.

Some may feel that hints can take away from the game, but with 80 different dens, I believe them to be a blessing.

Murder on the Zinderneuf

Computer: Commodore 64
Publisher: Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
Medium: Disk

You are on the luxury airship Zinderneuf in the year 1936 and there are 12 hours left before your flight from London docks at New York. Plenty of time to kill. The only problem is that someone took this literally. One of the 16 passengers is dead.

Murder on the Zinderneuf is a graphic adventure game centered around the solution of a homicide. Couched in a neo-classic murder mystery style, the program allows 36 minutes of real time (12 hours of game time) to solve the mystery. The methods for solving the crime are simple, but the entangling plots make daytime soap operas seem simple. In addition to alliances, friends, enemies, and liars among the remaining passengers, the material clues and verbal statements are contradictory and terribly obscure.

Murder on the Zinderneuf is a subtle game, for most of the complication is under the surface. It begins tamely enough, with the usual Electronic Arts logo appearing in various hues while the program laboriously loads (three minutes). Unlike some games, though, once the opening selections are made (one half minute to build the plot) the game is afoot without further disk delays. Since the search for the culprit can last more than a half hour, the break while restarting can be quite welcome (though only one minute long).

The first requirement is to choose a detective identity. Your choice will partly determine how successfully you will glean material clues or extract damning testimony. There are eight detective identities supplied and they all bear startling resemblance to investigators appearing in better-known murder mystery literature, movies or TV shows. You can be Harry Hacksaw, otherwise known as "Hard Harry," or perhaps Chief Inspector Emile Klutzeau, whose houseboy and valet Kongo is sadly absent. The list would not be complete without mentioning Miss Agatha Marbles, or Humboldt Hause. (He is the world's first scientific detective. He wears a moosestalker hat, smokes a calabash pipe and plays the accordion.) There is also Lieutenant Cincinnato, Charity Flaire, Achille Merlot, and Jethro Knight. Jethro, of course, is known in some circles as "the Angel" for his saintly behavior.

> Murder on the Zinderneuf *is a graphic adventure game centered around the solution of a homicide.*

After selecting your identity, you are presented with a segment of the floor plan of the Zinderneuf. The murdered passenger's identity is revealed in the message area at the top of the screen. While the clock ticks away (shown in the upper right corner of the screen), you must search the ship using a joystick to maneuver your character.

As an aid to navigation and deduction, the manual for the game has a centerfold that reproduces the complete floor plan, along with essential facts about the passengers and their staterooms. Each stateroom is color coded, as are the images of the remaining passengers that wander around the airship. Of course, passengers always have the same staterooms from game to game and they all have unique personalities.

To a sharp detective involved in the puzzle, all of these facts are significant. The cabin of the murdered passenger may contain clues like hair particles or cigarette holders. The other cabins may have similar clues, indicating liaisons between the passengers.

While the material clues in the cabins are a great help (these are found by guiding your character around a

Continued on pg. 122

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REVIEWED BY GORDON OWENS

Saucer Attack!

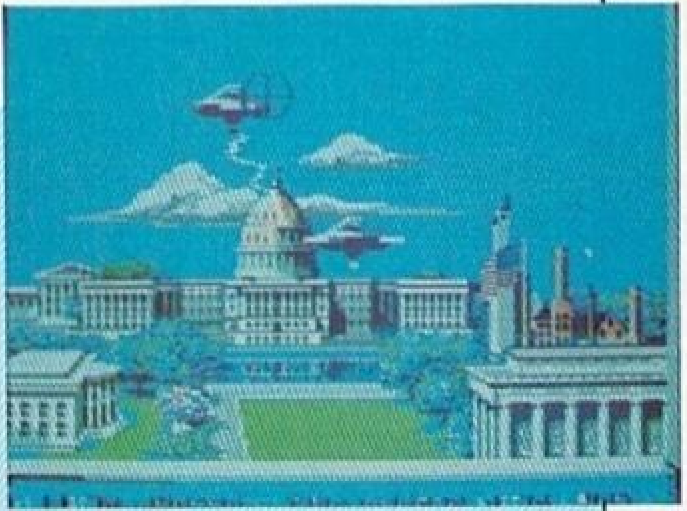
Computer: Commodore 64
Publisher: Sachs Enterprises
Box 1182
Lake Arrowhead, CA
92352
Medium: Disk

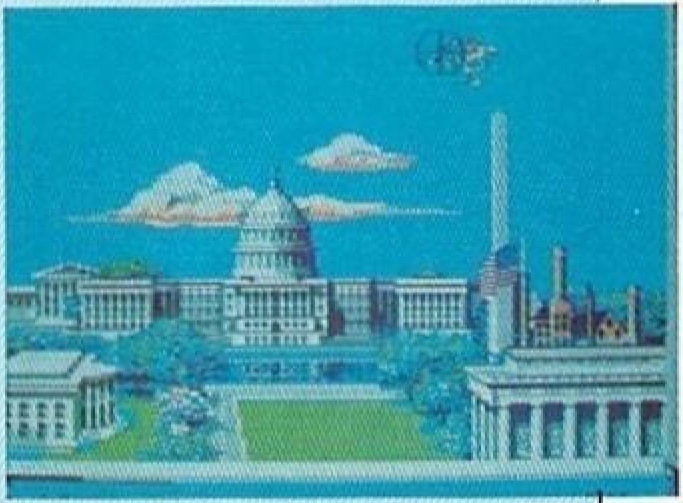
Strap yourself into your seat, limber up your trigger finger and prepare yourself for a unique experience. Welcome to *Saucer Attack!*, a joystick-controlled action game for the Commodore 64. Your mission: defend Washington, D.C., from attack by invading saucers.

At the start of the game, all is quiet as you wait at your post for an imminent attack. You line your sights on the first saucer and release a fireball. It hits and explodes, lighting the whole sky! The attack continues as you destroy saucer after saucer.

Suddenly, a lone saucer hovers over the Washington Monument, and then disintegrates it with a lightning bolt. As you stare in amazement at the remains of the Monument, another saucer tries to land. You had better destroy it before it lands or it's all over! So it continues throughout the day and into the night. Maybe, just maybe, if you're good enough, you'll get a shot at the mothership. Can you destroy it and join the celebration that will await you back home? If not, then you will be doomed to watch as Washington is destroyed before your very eyes!

Maybe, just maybe, if you're good enough, you'll get a shot at the mothership. Can you destroy it and join the celebration that will await you back home? If not, then you will be doomed to watch as Washington is destroyed before your very eyes!





Saucer Attack! comes neatly packaged in its own folder, chock full of information and with a full-color depiction of play. The instructions include information on loading, playing and scoring. I do recommend reading them before playing, because the playing tips are excellent. You can start the game over anytime by hitting the RESTORE key.

Once a fireball has been launched, its course cannot be changed. You also cannot launch another fireball until the first one has left the screen. After you launch a fireball, the crosshairs will move slower, but you can still move them for your next shot. However, whenever there is an explosion or when a saucer destroys a building, the crosshairs cannot be moved at all.

There are two types of saucers and only two saucers can be on the screen at any given time. The first saucer rotates from right to left. This saucer is easiest to hit, because it stops moving whenever a fireball is on the screen. The other saucer rotates from left to right and is much harder to hit.

As the player gains points, the saucers become harder to hit and increase in point value. The saucers will not try to destroy buildings or land until after the player has at least ten points. After that, you had better keep a close eye out for any saucers which hover near your buildings or over the landing area. The computer will flash a warning at the bottom of the screen when a saucer is attempting to land, thus giving you more time to destroy it.

Make every shot count. The saucers gain points whenever a lightning bolt is released, even if it hits a building which has already been destroyed. On the other hand, every time you score a point, the saucers lose a point. The score is also updated every time the fire button is pressed. This can be used to the player's advantage if the saucers are about to go over 50 points. The game ends when the saucers have fifty points or when a saucer lands, and is won when you have completed two screens.

The high point of *Saucer Attack!* is its excellent use of graphics. To my mind, *Saucer Attack!* has some of the finest graphics I've seen on any personal computer to date. The graphics have very smooth lines and there seems to be little or no problem with the "jaggies." A realistic flag waves in the breeze atop one of the buildings, for instance, and when the saucers destroy it, the flag glows with intense heat before melting.

Saucer Attack! also makes good use of the 64's sound capabilities. It has both excellent music and sound effects. For example, when you win the game you are rewarded with a fireworks display over Washington with realistic explosions and computer-generated music.

The game plays very smoothly with one exception. From time to time, a direct hit upon a saucer fails to explode it. Despite this, I highly recommend *Saucer Attack!* This is a game that will appeal to many different people. As the advertisement says, "This one really *is* different."

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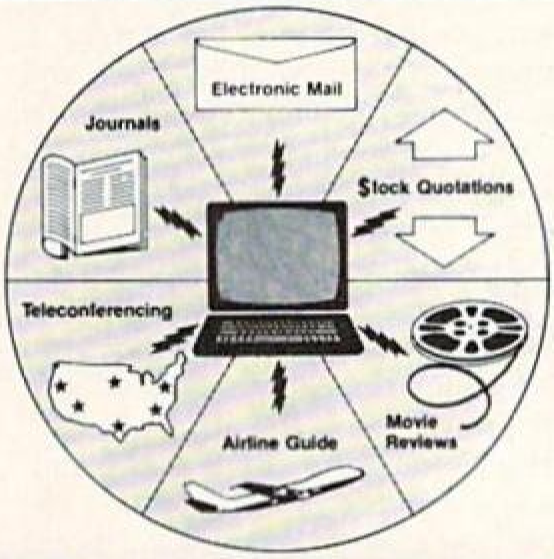
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REVIEWED BY TOM BENFORD

Stealth

Computer: Commodore 64
Publisher: Broderbund Software
17 Paul Drive
San Rafael, CA 94903
Medium: Disk

Awesome is a word that immediately comes to mind when describing *Stealth* from Broderbund. If you have the blahs when it comes to action games for your 64, take heed—*Stealth* is about to change all that.

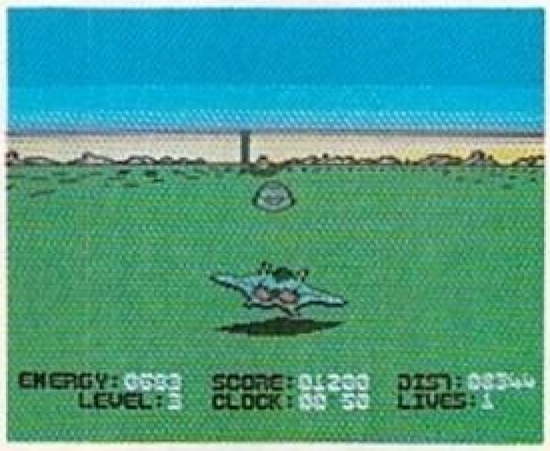
The game defies classification into any one genre; indeed, it is a *flying* game, but it's also a *scrolling* playfield game and a *shoot-'em-up* as well. The icing on the cake, though, is the element of *strategy* required to play the game full-term. Without a doubt, there's something for everyone here in *Stealth*.

Piloting a high-speed, low-level bomber-fighter craft, your mission is to zip along the enemy territory, barely skimming the surface, in order to escape radar detection. You steer your craft left and right by moving the joystick, increase your speed by pushing up on the stick, and slow down by pulling back on it.

A word about the craft itself is in order here: this is no ordinary attack plane you'll be using. Instead, it is a propulsion-powered "hot-rod" fighter that responds instantly to the slightest change in joystick position. The simulation of flying this craft at breakneck speeds with the landscape zipping by underneath is absolutely awesome—there's that word again. But, honest—it's true. The sensation of motion imparted to the player is unreal. You'll literally be pinned back into your chair from the imaginary "G" forces you'll be pulling.

You're provided with three fighters at the beginning of the game, which you'll use one at a time. Your mission is to penetrate the enemy perimeter and traverse a distance of 10,000 miles to the Black Tower (the enemy's citadel), whereupon you must destroy the edifice. The Black Tower will take one shot to explode on the first level, two on the second, three on the third, etc. There are five complete levels to a full-term game and each successive level is substantially harder.

The game defies classification into any one genre; indeed, it is a flying *game, but it's also a* scrolling *playfield game and a* shoot-'em-up *as well. The icing on the cake, though, is the element of* strategy *required to play the game full-term.*



The craft you'll be piloting uses impulse energy for power so you'll have to keep an eye on your fuel supply in addition to evading obstacles and shooting the foe. Randomly scattered on the desolate enemy terrain are energy pods. The yellow pods contain positive energy fields, which you'll use to refuel your craft. Conversely, you'll also encounter red negative energy pods which will *drain* your power; these should be avoided if at all possible.

The enemy fortifications are formidable and impressive. You'll be fired upon by tanks, from bunkers, scout planes, missiles and fighter planes. In addition to all this, you'll have to destroy land-based radar towers, since failure to knock these out automatically triggers the firing of a heat-seeking missile. These are particularly nasty, since they never quit their pursuit and they're extremely fast.

Your performance as an attack-mission pilot will be cumulatively rated from level to level during game play. Your overall scoring depends on several factors: the amount of enemy installations and weaponry you knock out, the speed at which you complete your mission, and how many of your own planes you expend completing the mission. An intermission screen is provided between play levels to appraise you of your status as a pilot and how you're faring in the game.

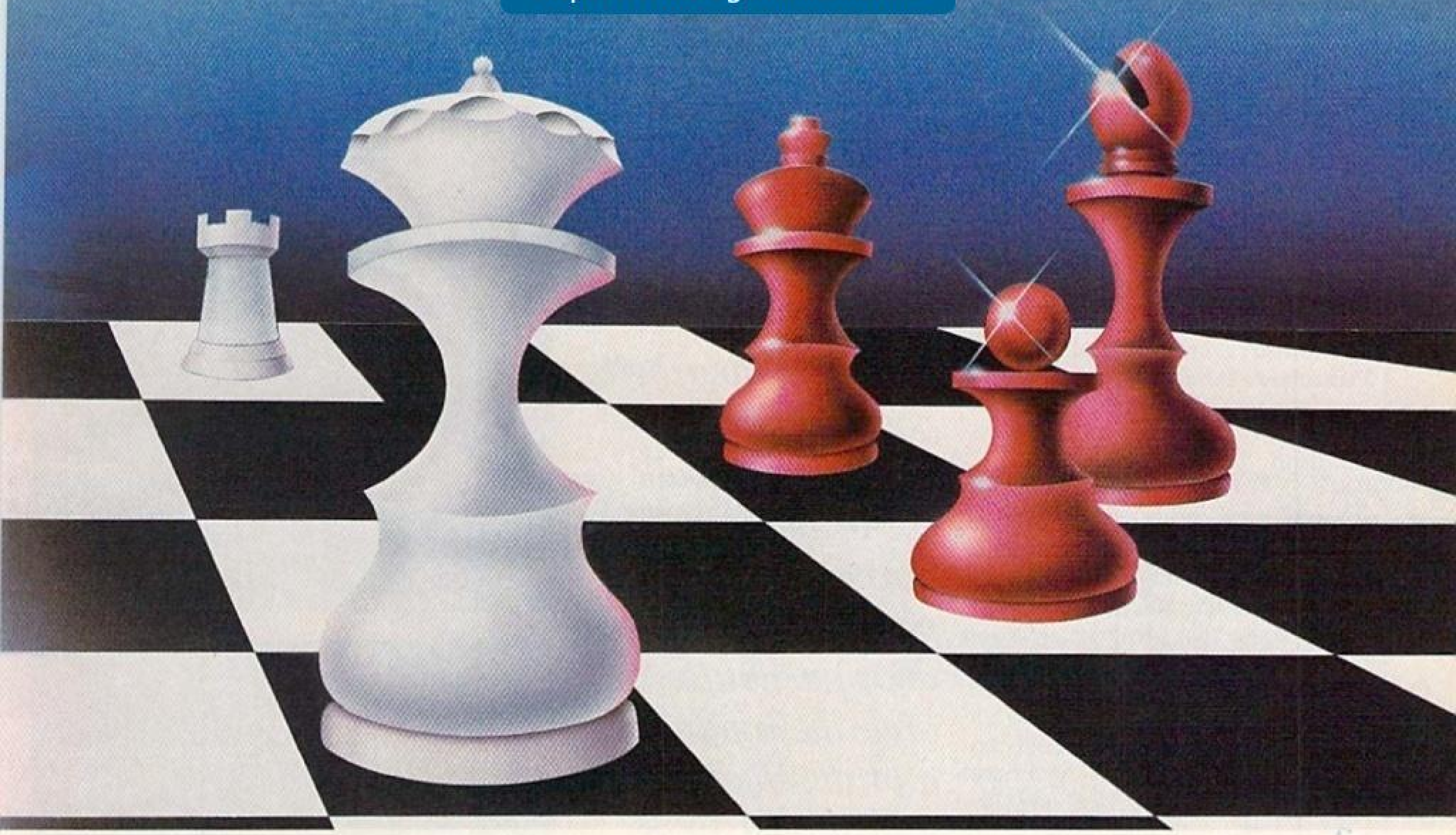
Level one is fairly easy to complete and level two is also on the easy side. Level three, however, sets apart the true gaming warriors from the curiosity seekers. Things really get hot as the enemy literally throws everything it has in its arsenal at you. You'll also observe that the positive (yellow) energy pods become increasingly more scarce as you ascend the levels.

Speaking of energy, I should mention that firing the craft's on-board laser cannon will cost you ten energy units and taking repeated hits from the enemy will quickly deplete the craft of energy as well. The fighter will carry a maximum payload of 3,000 energy units and it's good strategy to keep your fuel supply up to the maximum at all times. Oh, yes—the faster you fly, the more energy you'll use up as well, so bear that in mind.

Imagine, if you will, that you're in another plane following the attack craft. Your position is dead center on the lead craft and your viewing angle is slightly elevated. That's the perspective you'll be viewing and playing the game from—literally a "crosshairs" view.

Stealth is software *par excellence*. Everything, and I mean *everything*, about the game is positively top-notch: sound, color, graphics, breathtaking animation, play action, challenge level, continued interest—I'd really have to give it a "10" in all of these categories.

Do yourself a favor—go out and get a copy of *Stealth* for your gaming library—I guarantee you've never seen or played anything like it before! ■



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REVIEWED BY TED SALAMONE

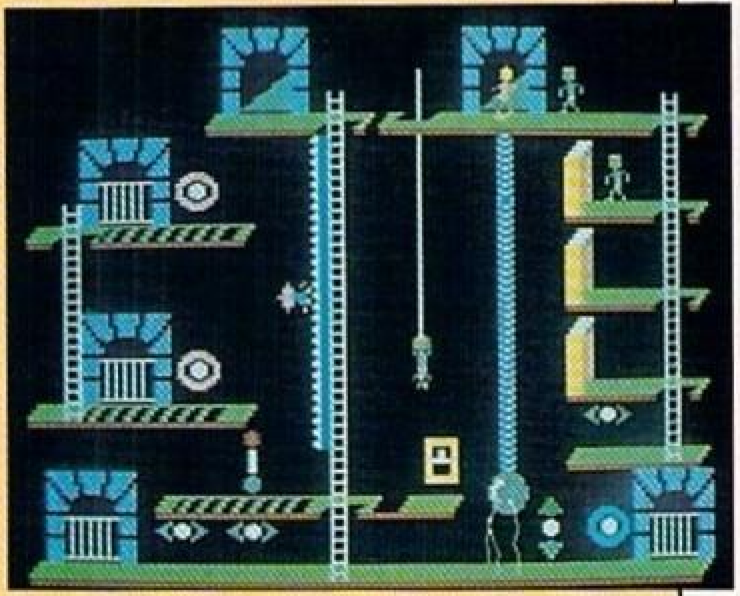
Castles of Dr. Creep

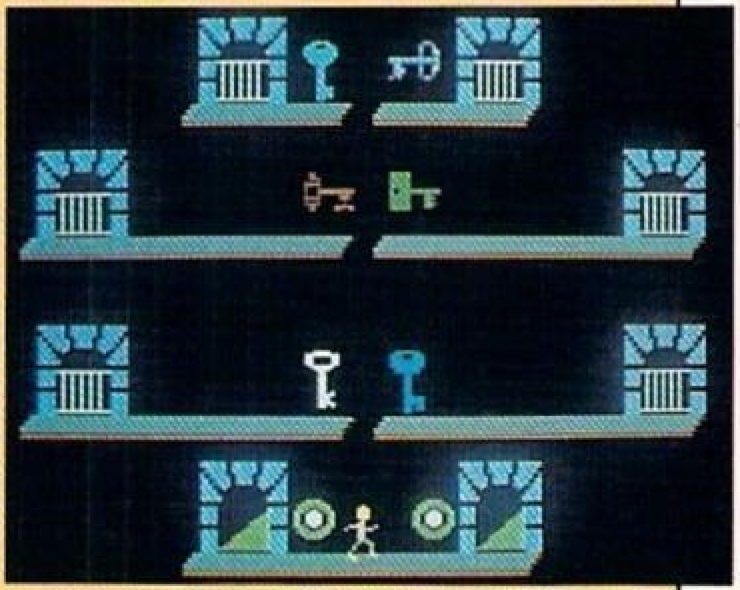
Computer: Commodore 64
Publisher: Broderbund Software
17 Paul Drive
San Rafael, CA 94903
Medium: Disk

Castles of Dr. Creep, a game from Broderbund Software, makes intriguing promises which Ed Hobbs, creator of the classic *Seafox*, has fulfilled.

The instruction pamphlet says you don't have to read much of it to understand the game. Take this advice, it's very sound—mainly because the written directions may be confusing. Boot the disk, watch the demo and play with the RUN/STOP and RESTORE keys. Also practice with the joystick fire button. Between this workout and the on-screen, interactive tutorial, you'll do just fine.

> *There are doorbells, power switches, moving sidewalk controllers, and ray gun control panels galore. Add the trap door pushbuttons, and the magnitude and depth of* Castles *quickly becomes apparent.*





As promised on the box cover, the haunting music is melodic, lilting and well, haunting. The other sound effects consist mainly of transporters being engaged, switches being thrown and electrostatic discharges.

Visuals are fantastic. Ed must have lavished considerable time and effort on these beauties. The overall symmetry is twisted, the scenery corrupted. Just what you'd expect in a house of horrors! Some of the best items are the lightning machines, force fields, matter transmitters and ray guns. They look, act and play real.

Colors abound! Awash in a sea of brilliant hues, *Castles of Dr. Creep* still manages to remain non-garish. This brilliance is achieved mostly through the contrast of sharp, well defined solid colors against jet black backgrounds. The effect is stunning!

Your video surrogate moves fluidly, although the average person wouldn't think someone with such a pointy head could walk and push buttons at the same time. He does, though. There are doorbells, power switches, moving sidewalk controllers, and ray gun control panels galore. Add the trap door pushbuttons, and the magnitude and depth of *Castles* quickly becomes apparent. This is a real *tour de force* in which climbing and running skills are of secondary importance. You must think this one through!

Mummies and Frankenstein monsters emerge from their crypts when you trip the magic ankh or pass them by. The surgical creations are the more dangerous of the two; they can climb the many ladders and descend the even more numerous fire poles.

With names like Carpathia, Romania, Baskerville and Callanwolde, these castles strike fear into your heart and stir up remembrances of superstitious tales of yore. If Frankenstein is close by, can Count Dracula and the Wolfman be far behind?

An overhead map view mode appears each time a room is entered. All entrances and exits can be seen at this time. Using a preformatted blank disk, it is also possible for players to save games in progress for continuation at a later date.

Speaking of time, there is no on-screen counter ticking away, forcing you into making rash moves. (There'll be plenty of those without the added pressure.) Time is displayed only in the view map mode, a thoughtful consideration for time-conscious gamers. Another nice touch is the ability to freeze the clock while you study the layout of a room.

Rooms and their passageways are color-coded to aid gamers in ascertaining their whereabouts in the maze of entrances and exits. Some doors can be entered only after the proper color-coded keys are acquired. Whew, there's a lot going on here.

Last, but far from least, is the two-player option. Support of two concurrent players controlling independent figures is a boon in disguise. Having an ally nearby often helps avoid many of the solo player's dead ends.

A word to the wise. There are still a multitude of dead ends where you'll have to forfeit a game life to restart the game from the beginning. Any time you die, it's back to square one. Don't get frustrated though—keep plugging. After all, the goal is important—to escape from the fiendish chambers of Doctor Creep!

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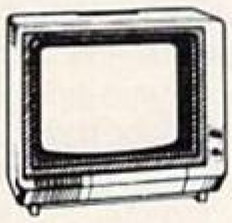

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REVIEWED BY MARK COTONE

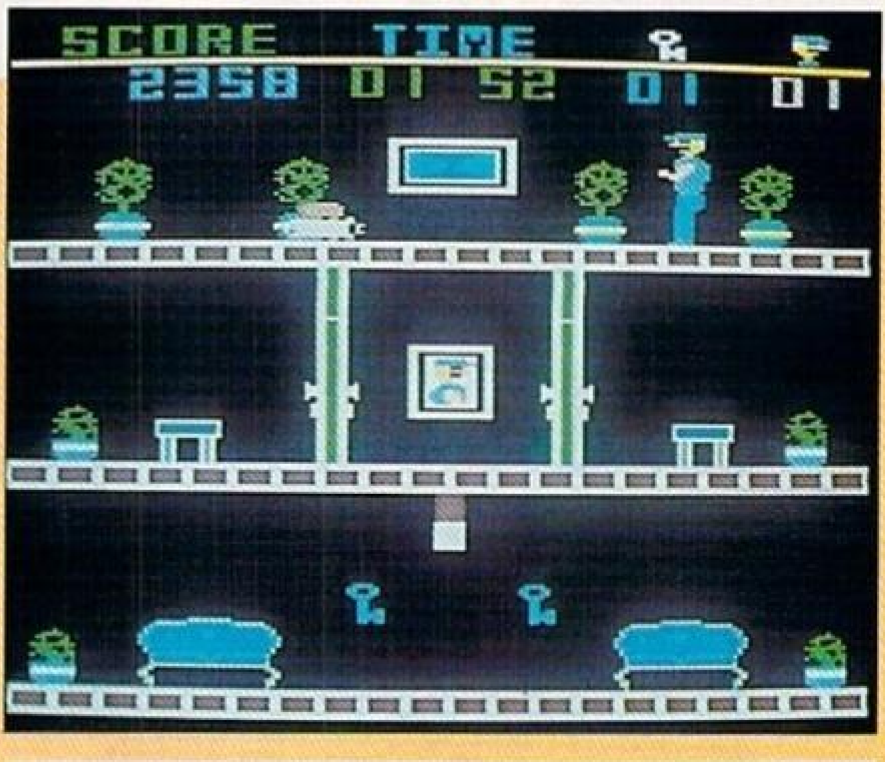
The Heist

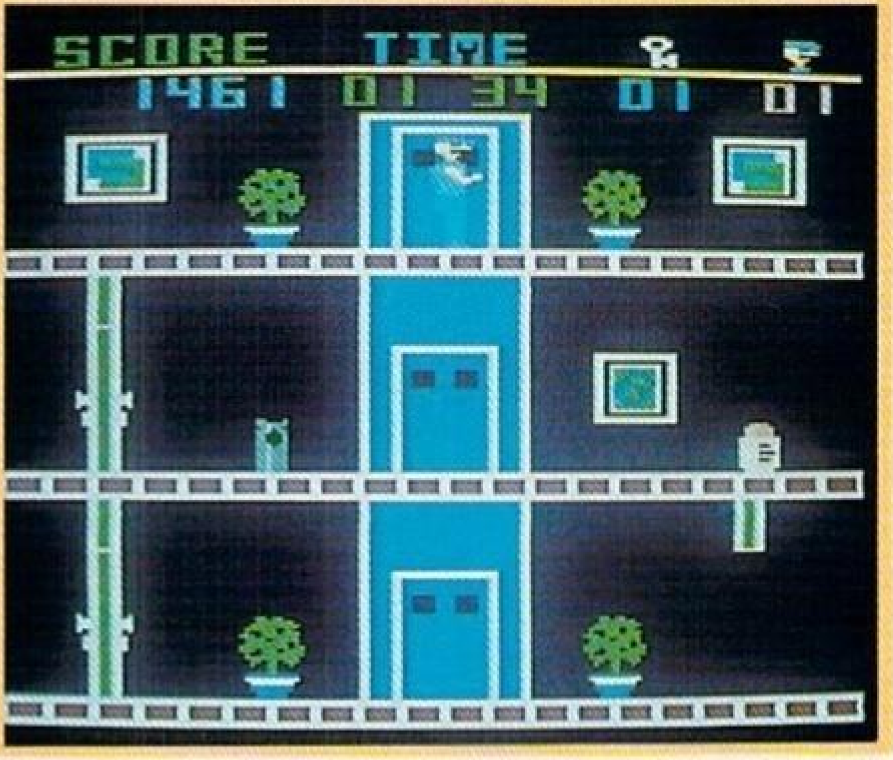
Computer: Commodore 64
Publisher: Micro Fun
2699 Skokie Valley Road
Highland Park, IL 60035
Medium: Disk

Of course, there is always the celebrated case of Graham Crackers. This suspect, after viewing floor upon floor of prints and paintings at a local museum, returned after-hours and attempted to abscond with every piece. When asked to explain this bizarre behavior, he calmly stated that he was not the average citizen he appeared to be, but was, in reality, a world famous super agent working incognito. He was forced to infiltrate the exhibition because he believed it to be a front for a terrorist organization. The apparent raid on all the housed artwork was, in actuality, a search for a secret microdot.

Super spy thievery? Museum terrorists? Hard to swallow, isn't it? Well, that's to be expected. For the Cracker Caper is more fiction than fact. Don't get me wrong, Graham does exist. But only as a monitor-confined hero in *The Heist*, Micro Fun's newest game for the Commodore 64. The plot may run a little thin, but the performance is guaranteed to please.

> *This high-caliber action adventure takes all the aspects of a formal art show and combines them with imaginative video obstacles and pitfalls, to give us an impressive arcade-style challenge.*





This high-caliber action adventure takes all the aspects of a formal art show and combines them with imaginative video obstacles and pitfalls, to give us an impressive arcade-style challenge.

The setup is reminiscent of Activision's *Keystone Kapers*. The screen is divided into horizontal thirds, which represent a cross section of a three-story museum, stocked with an assortment of related clutter.

There is the common—lamps, handrails, elevators, escalators, garbage receptacles and viewing chairs—and the uncommon—the vanishing walls, murderous crawling monitors, deadly electrically charged drones and the quick killing security sweepers.

The object, put simply, is to search through the structure, using your joystick-controlled Graham (who looks more like a taxi driver than an espionage agent), and collect the entire set of paintings while dodging an ever increasing number of dangers. If you can traverse all 90 rooms—three levels with 30 rooms each—and amass the collection, you will have uncovered the elusive microdot and saved the world.

True, computerized planetary salvations are common. The real test is in the game play and it's here that *The Heist* shines. With an inventive flair, Mike Livesay has taken the staples we've come to expect in these climb-and-seek challenges and devised an intricate contest.

Graham will be confronted by three types of inanimate security instruments while combing the museum. All can exterminate intruders, but each functions differently.

Drones are fire hydrant-size R2D2 clones which remain patiently stationary, awaiting a distracted trespasser's accidental kick. Monitors are low riding tank-type vehicles which track along the floor trying to trip-up any unsuspecting visitor. And finally, we have sweepers, which cruise through the air like hurled tomatoes.

Touch any of these menaces and a dose of voltage will cost you a life.

Now, this triple threat of marauders in and of itself may not raise any eyebrows. But incorporate this with a gapped-floor plan, where, in a single room, Graham might be forced to jump over a half dozen crevices in addition to evading the assorted apparatus, and we realize we are viewing a lesson in creative construction.

One screen could have a monitor riding back and forth along the entire length of a passageway, while the next screen might pose a center hiatus, with two separate monitors patrolling the smaller flanks. In another portion of the museum, this same obstacle could be crawling along a conveyor belt or frantically covering a strategically placed isolated platform, or perhaps two monitors might be tracking in tandem, separated by the narrowest of margins.

This diverse placement, coupled with any number of possible pitfall combinations, makes each room a unique puzzle. Here, Mike Livesay will continuously intimidate the audience with his devious imagination. But he never makes the mission impossible. Each problem has a solution and deadends will result only from player carelessness, not designer oversights.

Like all good contests in this genre, *The Heist* also has a time factor, keeping loitering to a minimum. The player, at normal game speed, can spend no more than two minutes between robberies. Initially, the clock won't be much of a restriction, since artworks are readily available and fairly accessible. But painting pickups should soon become less random or you might find Graham suffering drastic, fatal effects of aesthetic deprivation.

A clever, complex and exciting game, *The Heist* receives resounding applause. It's well planned fun for the young and old, requiring a supple touch, mentally and physically. But this gem does have some slight flaws, which should be mentioned.

The audio, for one, although accurate, is virtually nonexistent, with only an occasional bleep or zap signalling various on-screen actions. Also, if you're the type of player who likes to keep a tally of your high scores, don't blink after losing your last Graham. Your game total remains visible for only a second, then disappears forever.

Finally, the contest comes boxed with superficial instructions. The single sheet you receive with your disk gives you the bare bones and nothing more. Many of the basics are discovered only by trial and error.

Overall, however, the program is well done, with its high-resolution graphics, addicting gameplay and subtle strategic design. It is a first-rate piece of computer art displayed in a garage-sale frame. **C**

Helpful *Heist* Hints or How To Beat the Museum Scheme

Before going any further, let's first lay down some basics not explained in the enclosed instructions. These preliminaries are sure to help you in designing your individual strategies.

* You start the game with three lives, receiving an extra Graham for 10,000 points and 30,000 points.

* Keys obtained from one level are carried over onto the next.

* You can fall through any structural gap without harm, as long as there is a solid floor beneath you.

* There is a different number of paintings on display in each level, as listed below. Until you become familiar with the museum layout, count along to assure yourself a complete collection before you take any fatal leap.

Level 1 - 34
Level 2 - 36
Level 3 - 33

* When jumping any mobile obstacle, like a monitor or sweeper, wait until Graham and the device are moving in opposite directions. This technique requires less accuracy, as the object will pass under you while you are airborn.

* When approaching any stationary obstacle, like a drone or crevice, take the time to stop and insure a proper jump. The distance Graham covers will be the same whether he is in motion or leaping from a standstill. If you have time, it's better to be safe.

* When moving from one museum room to another, pause before entering. There is a dead area on either end of the viewing screen, similar to wings on a theatrical stage, where you can wait and view the area before actually moving Graham into the action. This will give you a chance to size-up the playfield, and, if necessary, use the game's pause feature to stop the timer and develop a plan.

* On each of the three levels, you will be confronted with double drones, two deadly security devices lined up together with a narrow gap between them. Although this is designed to look like an impasse, these obstacles can be beaten; but it takes practice.

On your first jump, place Graham's toetips a full brick's length away from the first drone. Then, after jumping, move your character back *into* this drone. This will give you ample room to clear the second device.

* When traversing any unfamiliar portion of the museum, stay on the top floors whenever possible. There are more ways to avoid danger by dropping down than by climbing up.

* On the two earlier levels, grab every key displayed and hold onto as many as possible. Keys are carried over from each level and are invaluable during the third stage. An experienced player will learn it is sometimes better to lose a life if it means the acquisition of a couple of keys. **C**

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REVIEWED BY TOM BENFORD

Tapper

Computer: Commodore 64
Publisher: Sega Enterprises
360 N. Sepulveda Blvd.
Suite 3000
El Segundo, CA 90245
Medium: Cartridge

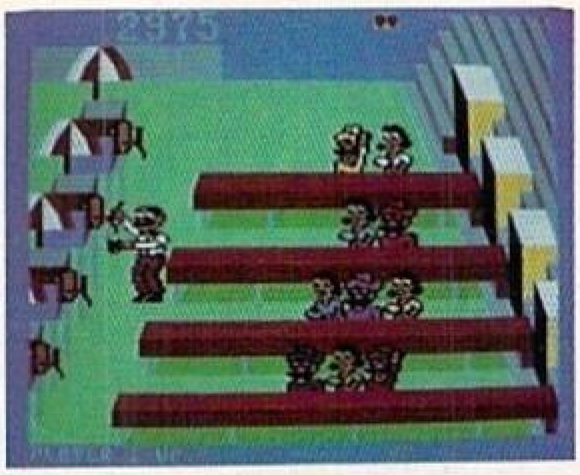
There are good games, and then there are *great* games—*Tapper* is, without a doubt, one of the *great* games for the Commodore 64!

Based on the Bally/Midway perennial arcade favorite, *Tapper* is a fabulous translation of the coin-operated original, featuring all of the lively sound, charming graphics and hairy play action of the arcade machine. Game play is initiated through the joystick or keyboard and will accommodate one or two players. I found that using a joystick is the only way to go, since the play action is quite hectic. Three play levels (beginner, arcade and expert) custom-tailor the game to the skill of the player.

The game's scenario places you, as the surrogate on-screen bartender, in charge of a busy tavern. Your task is to serve up mugs of beer to the thirsty clientele by drawing the beers and sliding them down the bar to the customers. At the same time, the patrons are sliding their empty mugs back and you must catch these as well. To make matters worse, the game takes place in one of those "rowdy" establishments where the clientele is long on thirst and short on patience; if you're not quick enough in serving them, they'll grab you by the collar and slide *you* down the bar, bonking your head into the wall!

Good bartenders in the game, just as in real life, are rewarded by tips for prompt service. Collecting a tip left by a customer is rewarding in several ways: the "tip" pays in points, the "dance hall girls" put on a can-can show, and the action temporarily slows down a bit, allowing you to catchup with your orders. This sojourn is brief, however, so you'll have to stay on your toes.

Tapper *is a fabulous translation of the coin-operated original, featuring all of the lively sound, charming graphics and hairy play action of the arcade machine.*



Each successive round greets you with more and more customers who are harder to please than the last bunch.

There are also several "intermission" bonus rounds included in the game. In these rounds, the "soda bandit" will appear on screen and shake up five of the six soda cans on the bar. He then disappears and you're treated to a taste of the old "shell game," wherein the cans are shuffled around. The objective is to select the single can of soda that *wasn't* shaken. When you've made your selection, press the action button on your joystick to finalize your decision. A correct guess rewards you with 3,000 additional points, while a wrong guess sprays the bartender with soda!

To add a bit of variety to the game, the bar scenes change. You start in an "old west saloon" with only a few customers, then progress to a "jock" bar. The "soda bandit" intermission is then presented and the cycle repeats itself.

As the game progresses, the difficulty increases. Clearing the screen of customers by satisfying their wants brings on the next round of play. Each successive round greets you with more and more customers who are harder to please than the last bunch. Sharp hand/eye coordination, a good sense of judgement and quick reflexes are all necessary to achieve respectable scores in *Tapper*.

In the beginner play level, you start with five bartenders and an extra bartender is awarded for every 10,000 points you score. The arcade level provides you with three bartenders initially and bonus lives are awarded at 20,000 points and each additional 60,000 points scored. The expert level is definitely for seasoned veterans of the game, since it only supplies you with two bartenders to start with and you must earn 100,000 points before you're given an additional life. (The Expert Level is enough to drive you to drink—root beer, of course!)

You'll lose a bartender's life anytime these conditions occur:

1) You fail to catch an empty mug and it smashes on the floor.

2) You send a full mug down the bar with no customer to catch it and it smashes into the wall.

3) You fail to serve a customer fast enough and they smash *you* into the wall!

Additional points may be earned for clearing the bar of customers, catching an empty mug, picking up a tip, completing a bonus round, and satiating a customer's thirst to the point where he or she leaves the bar.

Unfortunately, the high scores for each play session aren't displayed, so it may be a good idea to keep a pencil and paper handy if you're interested in keeping records of your scores. Other than that, I found no shortcomings with *Tapper* and I recommend it highly for every gamer who's looking for a fun game that keeps its challenge!

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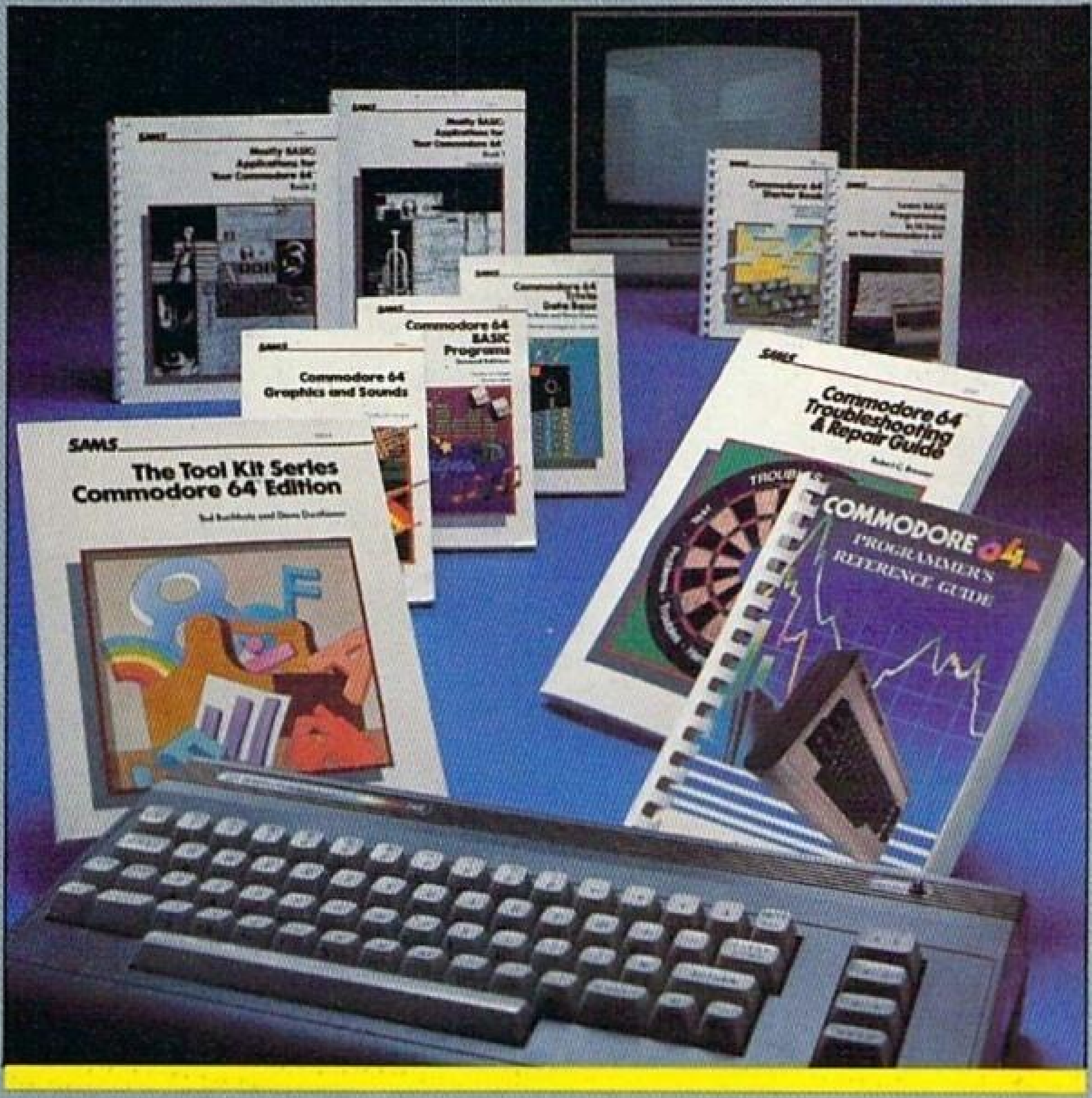
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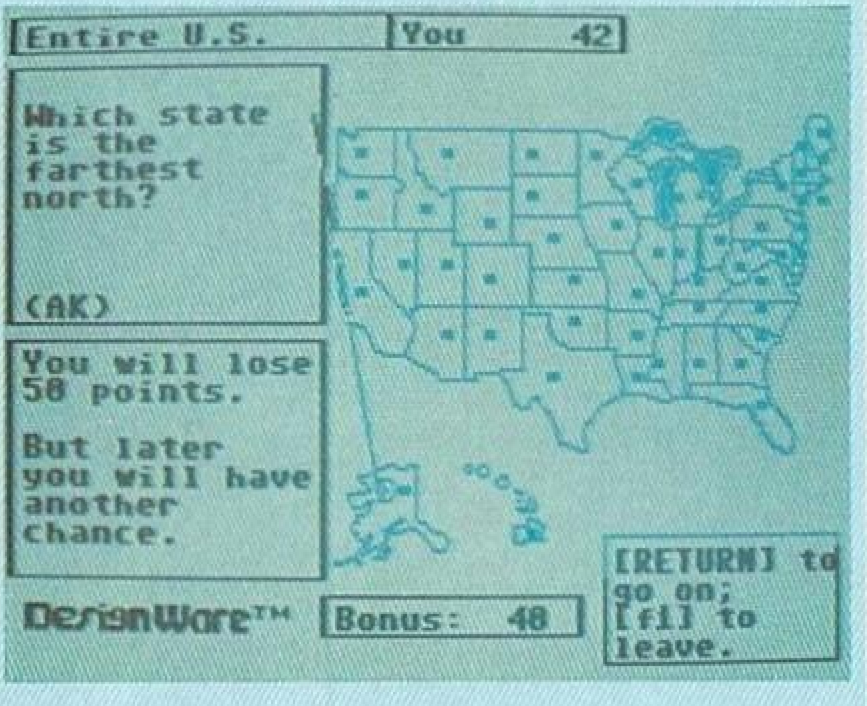
REVIEWED BY CHRISTINE ADAMEC

States and Traits

Computer: Commodore 64
Publisher: DesignWare
185 Berry Street
San Francisco, CA 94107
Medium: Disk

Available traits include state names, historic facts, bordering states, capitals, current facts and landforms.



Entire U.S. You 42

Which state is the farthest north?

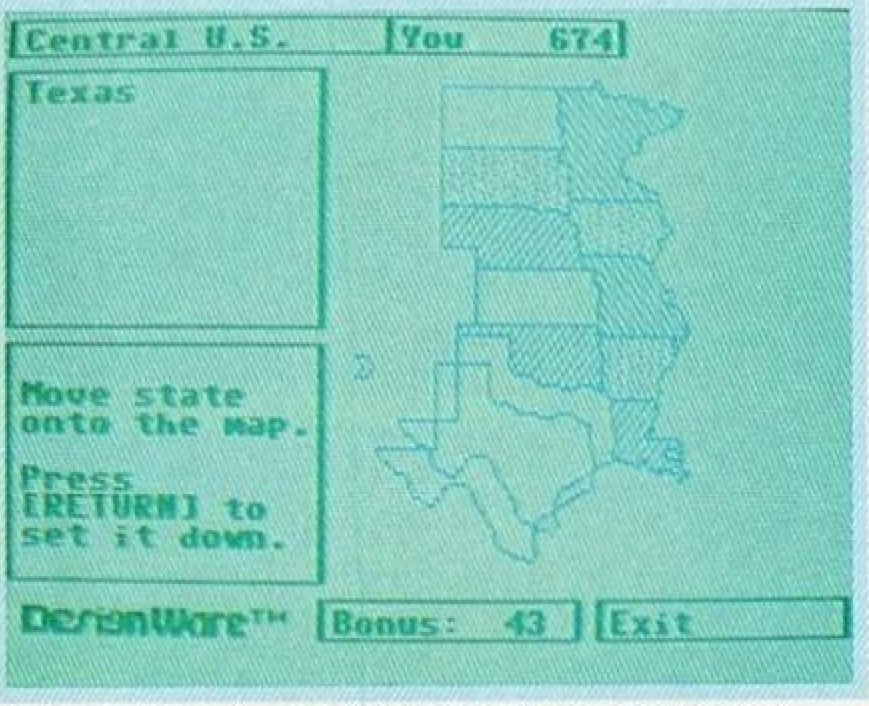
(AK)

You will lose 58 points.

But later you will have another chance.

DesignWare™ Bonus: 48

[RETURN] to go on; [f1] to leave.



Central U.S. You 674

Texas

Move state onto the map.

Press [RETURN] to set it down.

DesignWare™ Bonus: 43 Exit

Are you good at geography? I know what my state looks like, but until recently, I was still confused by all those square-looking ones in the middle of the United States—Kansas or Wyoming—who knew? And sure, if you showed me where South Dakota was, I could find North Dakota—but find both of them—horrors! Luckily, help is on the way with a new game from DesignWare. Kids can learn geography and have fun at the same time.

This new program is called *States & Traits* and it's jam-packed with information for children ages nine and up. (Fun for adults too!) You receive numerous options at the beginning—do you want to use a joystick or the keyboard? (Use the joystick—much easier!) One or two players? Do you want a white or black background? (Black's much easier on your eyes.) There are also "easy" and "hard" game-playing levels. Another important choice: do you want to use state borders or would you prefer rivers and mountains? (Rivers and mountains are pretty tough, so you'd better start with the state borders.) Plenty of options to choose from, making for hours of play time!

The computer will load up a map of the United States—or parts of the United States—your choice. Your goal: move the state from one side of your screen to its rightful place. You move the shape with your joystick or keyboard until it's right on top of the state, press your joystick button, and (hopefully) receive a "That's right!"

The state is then colored in with stripes or dots. This way, you can rule that state out as a possibility later, when figuring out where other states go. It also gives you a feeling of accomplishment.

What if you put the state in the reads, "That state belongs here," wrong place? The computer screen showing you the right answer. Later, to reinforce the instruction, you're asked to place that state again.

You'll have about 50 seconds to earn bonus points for finding each state. But even if time runs out, you can still get points for putting Alaska or Idaho where they rightfully belong—50 points, no less, for a right answer.

If you get tired of this game and want to change your options, don't worry, you can. Merely press the F1 key to break out and move on. You can now pick a "trait." Available traits include state names, historic facts, bordering states, capitals, current facts and landforms. (Landforms are things like Mount Rushmore.)

Let's say you've picked state capitals. This time you'll move what looks like an arrow connected to a string. Bring it out to the state and get it right next to the dot representing the capital. If the question is, "In what state is Tallahassee the capital?" you don't score points for just putting your marker somewhere in the state of Florida—precision counts. If you make a mistake, the computer draws its line to the right capital.

At the easiest level of the game, each state is dotted. As time passes, dots for the "wrong" states disappear until only five dots are left, giving you a 20% chance of guessing the right one. At the "hard" level, the dots remain and you have to figure out the

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REVIEWED BY KEVIN DEWEY

Raid Over Moscow

Computer: Commodore 64
Publisher: Access Software
c/o Omni Marketing
841 South 500 West
Bountiful, UT 84010
Medium: Disk

In *Raid Over Moscow*, the time is the future. The United States and the Soviet Union have reached a comprehensive disarmament treaty. The United States has kept its side of the bargain, dismantling its entire nuclear arsenal and is in the process of replacing them with a defense network of 12 laser-firing satellites and four space stations equipped with stealth aircraft. One space station is already manned, while the rest are still under construction.

Since the treaty, however, the Soviets have fallen far behind the United States in their plans for a defense system. They have dismantled their entire arsenal, but, in an attempt to avoid vulnerability, have hidden new nuclear arsenals within three of their major cities.

Meanwhile, in the Persian Gulf, a coup in Saudi Arabia has left the area extremely unstable, so the Soviets have sent in troops to ensure Soviet control, while the United States has sent in troops to aid the Saudis.

This has prompted the Soviets to launch a nuclear strike against the United States and issue an ultimatum stating that if all American troops aren't withdrawn, missiles will be launched.

The only hope for the United States is their single armed space station. You, as the Space Station Commander, have an enormous responsibility. You must lead your men on a virtual suicide mission, knocking out the Soviet's launch sites and control systems to prevent the missiles from being launched. Then you must go into Moscow with only the weapons you can carry and lead a counter strike on the Soviet defense center.

> *You must lead your men on a virtual suicide mission, knocking out the Soviet's launch sites and control systems to prevent the missiles from being launched.*

There are six different action screens, but they have one disadvantage—often you must play through ones that you've already mastered to get to ones more challenging. However, this will not detract much from your game pleasure.

The joystick controls, while not easy to learn at first, do provide you with a lot of control and response. The play basically consists of sighting a launch site, getting your ships out of the hangar, speeding through enemy defenses and blowing up the silos. Then you must go into Moscow, attack and break into their defense center, and battle it out to explode the reactor.

The graphics are also top-notch, with amazing attention to detail. The fighter ships, hangar, trees, buildings, explosions and enemy soldiers are all stunning. Soldiers twisting and turning in the air as they fall from ledges after being hit, fighter ships barely squeezing through the closing hangar door, pieces of buildings crumbling down and crushing enemy tanks are all accurately depicted.

The sound effects are just as good as the graphics. From the moment you begin to play, you will hear motors, guns, explosions and typical war sounds. So is this non-stop noise good or bad? Definitely good, my friend. The sounds help to intensify the mood, but they don't become annoying.

There are three skill levels, a pause feature, a mission-abort feature, and an automatic demo feature, which is the best of them all. With the automatic demo, you can watch the computer go through all the scenes of the game and pick up game play at any point just by moving your joystick. This is very helpful if you want to practice certain screens.

I did find, however, that leaving the hangar, getting past the Soviet defenses, and blowing up the silos got rather tedious since the screens are always the same. The game also has no top ten scores list. A game of *Raid Over Moscow* lasts about 25 minutes and it would be nice to be able to record the resulting score.

Overall, *Raid Over Moscow* is well worth your money. The graphics and sound are excellent and the multiple screens keep interest from waning. Whether you're a war buff or not, you'll play *Raid Over Moscow* again and again.

---

right state. That's when you're on your own!

Historic facts are also fun—but this section is extremely challenging, one even adults might find tough! Sure most of us know where the 1849 Gold Rush occurred. (California, in case you're mystified.) But how many of us—or our kids—know the answer to this next one? "In which state is Oraibi, the oldest continually inhabited town in the United States?" (Give up? It's Arizona!) This part is genuinely fun for all you trivia freaks out there. In fact, you can even add in your own traits later.

Any criticism? The program does take an inordinately long time to load—around seven minutes—so don't expect immediate action. And for those of you who demand a lot of action or music, this program is not for you.

I think *States & Traits* is an excellent value—it's fun and clearly educational. I see it as a useful and entertaining program for both home consumers and school children.

So, if you'd like to make geography more than palatable—actually exciting—check out *States & Traits*. I think you'll be as impressed as I was. I have only one question for DesignWare: now that the kids and I have figured out the United States, when do we get the world?

REVIEWED BY TED SALAMONE

Blockade Runner

Computer: Commodore 64
Publisher: Interphase
6391 F Westminster Highway
Richmond, British Columbia, Canada V7C 4V4
Medium: Disk

Blockade Runner for the Commodore 64 is a fine example of an outer space shoot-em-up game. The play action, graphics, and challenge level are right up there with the best. It's quite a gaming experience—one which even the most advanced players will have a hard time mastering.

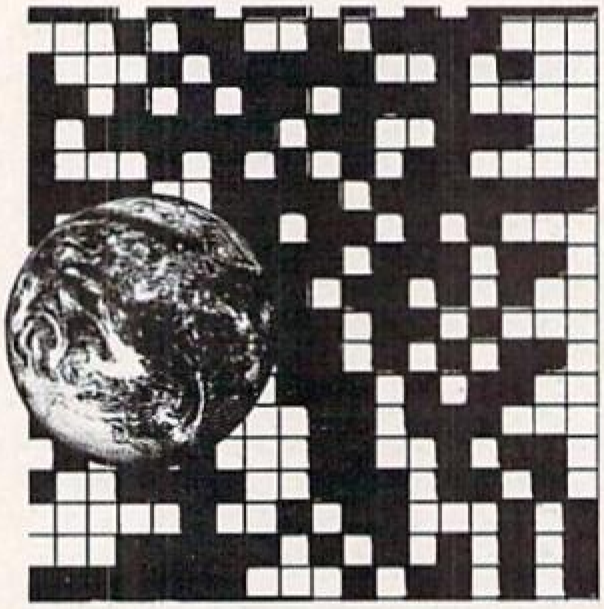
Armchair admirals must pilot a four-vessel fleet to Mother Earth with critically important provisions so the planet can hold out against alien invaders. Along the way, gamers have to avoid asteroids, destroy homing space mines, and defend against hostile forces.

Squadron commanders must also monitor fuel consumption and arrange for refueling. The nearest "gas" station consists of a dense cloud of blue ice pellets. Scooping these pellets up replenishes the supply of nuclear fusion material and bolsters the craft's defenses. Miss the first pitstop and it's curtains for all aboard!

The protective force-fields absorb the energy of direct hits (meteors) and weapon discharges (mine explosions and plasma bursts). In doing so, however, they heat up to critical levels. To prevent this, avoid contact with debris, shoot down all the space mines, and duck the plasma bursts. The other, more advisable, effective solution is to corral the meandering ice shards. This is sometimes like roping a steer, which is definitely easier said than done.

Although the deflectors do cool down, the pace at which they do so is that of a snail out for a leisurely Sunday stroll. If a 25% margin of safety is all that remains, it's nearly impossible to survive the next wave.

> *Armchair admirals must pilot a four-vessel fleet to Mother Earth with critically important provisions so the planet can hold out against alien invaders.*



Robot mines zip by, only to tag along behind each craft. Since some tricky maneuvering is needed to target them once they've dropped out of sight, it's best to zap them before they slip past.

Velocity is very important too, because these robotic trackers with the explosive personalities won't sit still. Running through an internal countdown sequence, they flash yellow to blue to red, teasing you about impending danger. Take just one hit and the barrier temperature rises significantly. Get tagged two or three times, and poof! you're nothing more than a fond memory.

On top of everything, alien ships can overtake the freighters. Firing destructive plasma bursts which grow as they approach, these vessels make formidable foes indeed. One hit increases shield temperature by a whopping 30%.

More like the mines than the asteroids, the invading ships can be fired upon. Depressing the joystick button launches a pulsing sphere of energy that locks onto the target like a bloodhound after a convict. They'll even go off screen to get the job done.

Enemy craft are much more difficult to destroy than space mines, because three hits are needed. Color coding signifies the degree of battle damage, making assessment easy for otherwise occupied gamers.

Though allotted unlimited firepower, players must practice conservation and marksmanship because reloading isn't accomplished quickly. (Once safe on Earth, it would be good to drill the munitions crew; they seem to think they're on holiday.)

A mission ends when the fleet is devastated or Terra has been attained. A mission scoreboard recounts all the vital statistics, from miles traveled and final score to the number of refuelings, collisions, mines eradicated and alien craft obliterated. It's a thorough debriefing.

Space jockeys successful enough to deliver the supplies continue more of the same action at a faster, more challenging pace.

Control is accomplished mainly with the joystick and firebutton, though the pause and restart function (key "R") comes in handy. F1 increases speed, F7 puts the dampers on the nuclear pile. Response is fluid and immediate.

The working instrument panel and meteors are done in eye-pleasing colors and detail. Nonetheless, the real graphic treat is undoubtedly the incredible three dimensionality of the oncoming asteroids, mines and plasma bolts. Add the outgoing rounds and the enemy craft themselves, and *Blockade Runner* becomes a vertigo nightmare.

Sound effects are supplemental in that they primarily warn pilots about upcoming ice shards and mines. But playability is *Blockade Runner*'s greatest achievement. Planning, fast reflexes and "knock on wood" luck are needed to run this blockade.

One of the best features *Blockade Runner* has to offer is the automatic skill level adjustment. Get hot and the trouble mounts accordingly; become devastated, and the pace slackens for you to catch a breather and regroup. Extremely nice touch.

I highly recommend this game.

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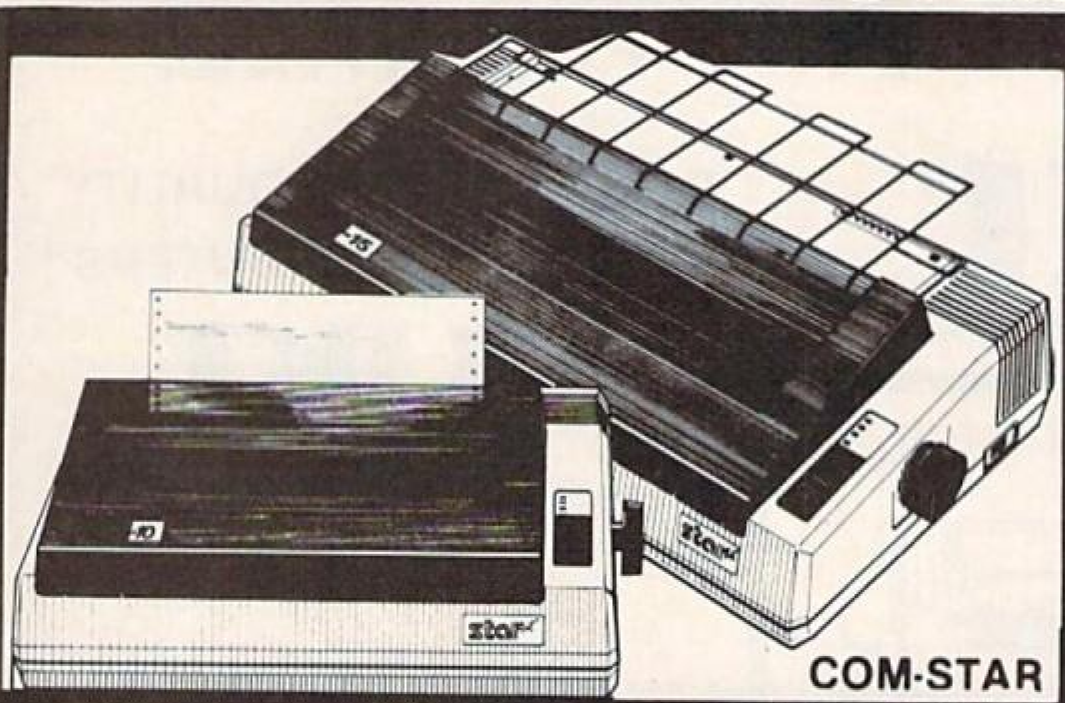

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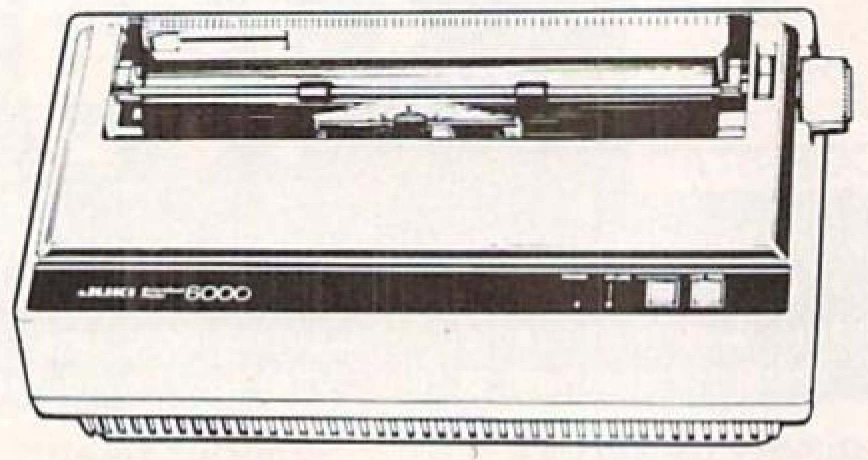

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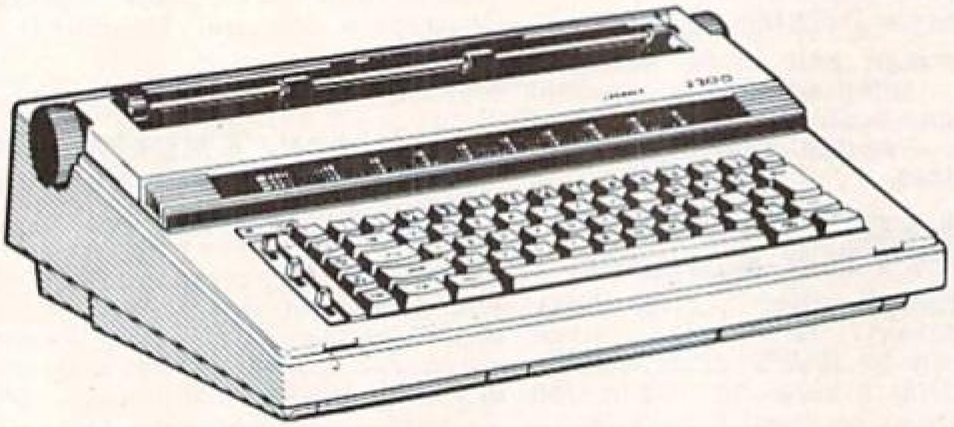

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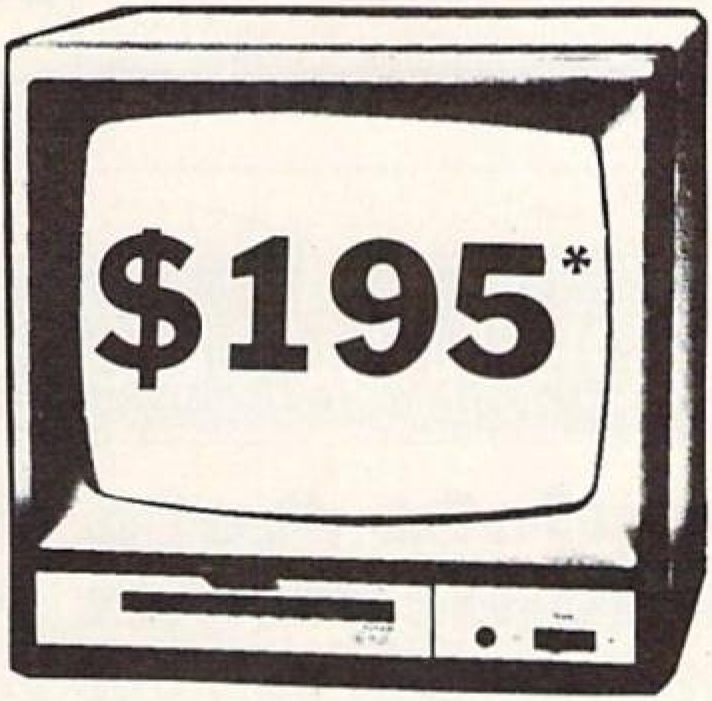

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Complete Auto Dial Telecommunications Package

"The only telecommunications package you will ever need."

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NEW

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- Download Text, Program or Data Files
- Stores on Disk Downloaded Files
- Reads Files from Disk and Uploads Text or Program Files
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- Plus Much, Much More

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Special Low-Low Price $59⁰⁰

We are so sure this is the only telecommunications package you will need we will give you 15 days Free Trial.

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COMMODORE-64

VOICE SYNTHESIZER

NEW

NEW

MAKE YOUR COMPUTER TALK

VOTRAX BASED HARDWARE

SALE

ONLY **$59.00**

You can program any words or sentences • Adjust volume and pitch • Receive Modem messages • Make adventure games that talk • Real sound action games • Make customized talkies • (Demo disk or tape included)

You can add TEXT TO SPEECH SOFTWARE that allows you to simply type what you want to hear!! Also allows you to add sound and voice to SCOTT ADAMS and "ZORK" ADVENTURE GAMES. List $29.95. SALE $19.95. (Disk or Tape).

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
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COMMODORE 64

80 COLUMN BOARD

SALE

FOR ONLY **$89.00**

(Word Processor Disk Program included FREE!!)

Now you can program 80 columns on the screen at one time! Converts your Commodore 64 to 80 columns when you plug in the PROTECTO 80 Expansion Board. List $199.00. **Sale $89.00.**

Includes 4 Slot Expander and can be used with most existing software!!!

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MD2D 96
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Box of 10 *with hub rings, sleeves and labels*

Famous Brand FUJI Floppy Disks for those who care about keeping their data.

List $39.95

Single Sided — Double Density

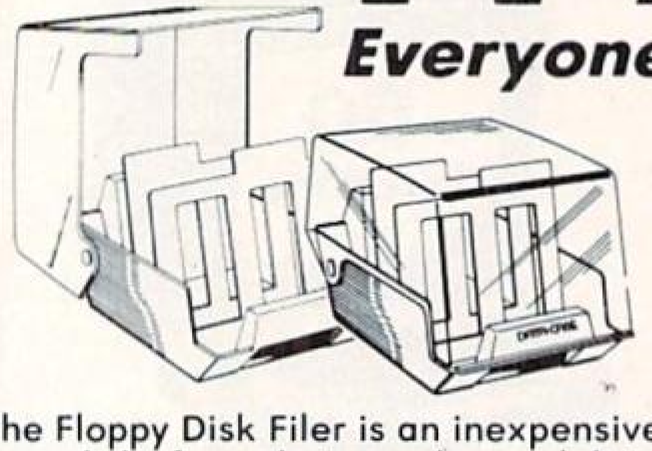
for Commodore 64, Atari, Apple

Sale $14.90

*** $12.95** ☆ ☆ ***Flip-N-File*** ☆ ☆ *** $12.95**

Data-Case

Floppy Disk Filer



Everyone Needs a Floppy Disk Secretary

Facts:

- Dust and Dirt particles can hurt your disks
- Most disks go bad due to mishandling in storage
- Proper filing of your disk collection will reduce unnecessary handling of your disks

The Floppy Disk Filer is an inexpensive hard plastic Fliptop case that will allow for easy filing, and protect your disks from dust, smoke, and dirt. Plus, the Floppy Disk Filer will keep all your disks out of unwanted hands and in one place where you can easily find them. **(Holds Over 50 Disks)**

List $24.95

Introductory Sale Price $14.95

** Coupon $12.95*

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Commodore 64 **CARDCO** **Commodore 64**

Fulfill All Your Personal & Business Needs "NOW"

Write Now! — Word Processor

Easy To Use Cartridge Based Word Processor for the C-64, With Full 80 Column On-Screen View Mode

The WRITE NOW! word processor provides you with the easiest to use, fastest to learn format available for your Commodore 64 computer. It will give you all the fetures you would expect in a professional word processor and some features not found in any other Commodore 64 word processor.

(Cartridge) List $49.95. **Sale $34.95.** *Coupon $29.95.*

- Program is on cartridge and loads instantly so there is no waste of time loading from unreliable tapes or disks.
- Built in 80 column display allows you to see exactly what you will print including headers, footers, justification, page numbers and page breaks.
- Can send all special codes to any printer, even in the middle of a line without losing proper justification.
- Page numbering in standard numbers or upper or lower case Roman numerals.
- Full string search and search/replace functions.
- Direct unlimited use of previously stored text from tape or disk called from within text during the print out so it uses no memory space and allows creation of unlimited length documents.
- Full scrolling up and down through text.
- No complicated editing modes or commands.
- Multiple line headers and footers.
- Justification and text centering.
- Block copy and delete commands.
- Save text to tape or disk.
- Easy full screen editing.
- Works with any printer.
- Easy to understand instruction booklet.
- 4 help screens included.

Spell Now — Spell Checker

"Spell Now" is a disk based professional spelling checker that interfaces with the "Write Now" word processor for the C-64. Use "Spell Now" to check the spelling in your "Write Now" files. It includes all features of the most expensive spelling checkers on the market. (Disk) List $39.95. **Sale $19.95.**

- 34,000 word dictionary.
- 1,000 word mini-dictionary.
- Unlimited number of supplemental dictionaries (user-definable).
- You see status of spelling check.
- Menu-driven; user-friendly.
- Fully compatible with "Write Now".
- Allows for marking, immediate correction and viewing in context.
- CARDCO, INC.'s Lifetime Guarantee.

Mail Now — Mailing List Software

The "Mail Now" is a disk based full random access data base designed to be used with the "Write Now" word processor. "Mail Now" allows the user to merge an address file into the text of the word processor for form letters. (Disk) List $39.95. **Sale $19.95.**

- Machine language fast sort.
- User-friendly, totally menu-driven operation.
- 10 character comment line.
- User-defined, print format can print one, two or three labels across.
- 2 character category field.
- Supports 600 entries per disk.
- Quick (in memory) sorts by Zip, Category, Last name and State.
- Includes data back-up utility.
- CARDCO, INC.'s Lifetime Guarantee.

File Now — Database

"File Now" is the inexpensive data base you've been waiting for. "File Now" interfaces with the "Write Now" word processor for the C-64. Helps you with data base management of your "Write Now" files and keeps separate data bases for other important information. (Disk) List $39.95. **Sale $29.95.**

- Functions as a deck of 3 x 5 note cards.
- Fields are user-definable.
- Full edit features; add, edit, delete.
- Searching is bidirectional.
- Wild card searching and printing.
- Capacity up to 700 cards per file-disk.
- Fully compatible with "Write Now".
- CARDCO, INC.'s Lifetime Guarantee.

Graph Now / Paint Now — Graphic/Logo Generator

A full graphics package capable of generating line, bar graphs and graphic art designs such as logos and pictures to be used with "Write Now" for the C-64. Save your graph or logo in a "Write Now" compatible file and print it out along with your "Write Now" text file. (Disk) List $39.95. **Sale $19.95.**

- Allows plotting of x,y coordinates from software or keyboard.
- Compatible with "Write Now" files.
- Menu-driven; user-friendly.
- Draw lines, rectangles and circles.
- 3 fill shades; white, gray and black
- Character font editor
- Load or save graphics.
- Optional joystick control.
- CARDCO INC.'s Lifetime Guarantee.

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Commodore 64

The Most

Practical Business Software

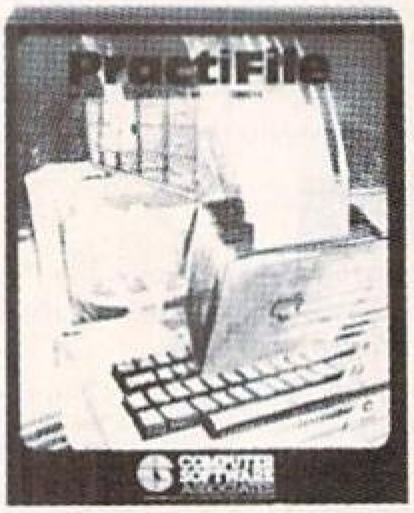
Special Low Low Prices - While Supplies Last

• Word Processor • Spread Sheet • Data Base • Diagnostic

• Track Expenses, inventories, investments • Make Charts and Graphs • Project Profits

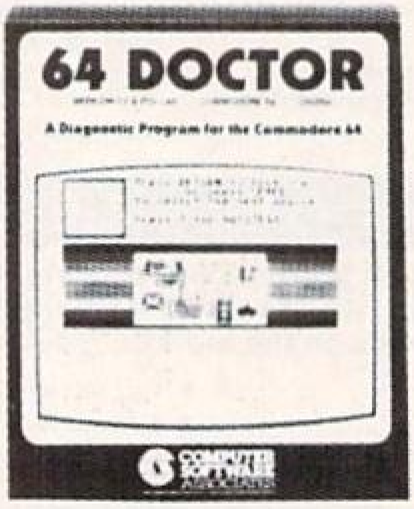
Practicalc 64: A consistent best seller, Practicalc 64 has become a reference standard among Commodore 64 spreadsheets. With features like alphabetic and numeric sorting and searching, variable comumn widths, graphing and over 30 math functions, this program is an exceptional value. Practicalc 64 also interacts with Practifile, forming the perfect small business bundle.
List $59.95. **Sale $24.95.** (Disk or Tape)

• Keep Mailing Lists • Change Records, numbers, methods of filing • Information Retrieval



Practifile: Flexibility and large capacity make Practifile the ideal data-base manager for the Commodore 64. (3800 records per file, sorts 5 fields at once.) Files written with the program are compatible with Practicalc 64 and popular word processing programs such as EasyScript, Word Pro, PageMate and PaperClip. Finally, a full-featured data-base at an affordable price!
List $59.95. **Sale $24.95.** (Disk.)

• Test RAM Memory • RS-232 Port • Keyboard • Video • Audio • Joystick • Printer • Disk Drive • And More!



64 Doctor: A special diagnostic program for the Commodore 64, 64 Doctor takes the guesswork out of isolating troublesome hardware problems. The program tests each piece of hardware to pinpoint defects and help prevent costly and time-consuming service calls. An essential program for all Commodore 64 users!
List $34.95. **Sale $19.95.** (Disk.)

PractiCalc II *Better than Lotus 1-2-3* *Coupon $44.95*

PractiCalc II, a fast, versatile spreadsheet with database and word processing features, does away with erasers, broken pencils and a wastebasket filled with scrap paper. PractiCalc II, with its functions and features, has the ability to complete simple and complex tasks. PractiCalc II is flexible enough to be used for checkbooks, alphabetized lists, home budgets and business financial statements. PractiCalc II is the tool of the eighties. List $69.95. **Sale $49.95.** Coupon $44.95. (Disk)

With PractiCalc II you can:

- Use 250 rows by 100 columns
- Use 36 math functions from simple addition to square roots and trig functions.
- Sort alphabetically and numerically.
- Use upper and lower case letters.
- "Hide" columns of numbers for special reports without losing data.
- Create fixed titles of several rows and/or columns.
- Replicate any data in any area.
- Adjust individual column widths.
- Use graphic display option.
- Set global and individual cell formatting.
- Use IF ... THEN statements.
- Edit labels and formulas.
- Format disks from within the program.
- View disk catalog from within the program.
- Write expanded labels up to 88 characters long.
- Insert, delete and move information with ease.
- Start using PractiCalc II within ten minutes of opening the package.
- Consolidate separate spreadsheets for totalling.
- Search for known and variable entries.

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Computer Learning Pad

- **Makes graphic tablets Obsolete**
- **Includes Special Printer Feature**

Sale! $37.95

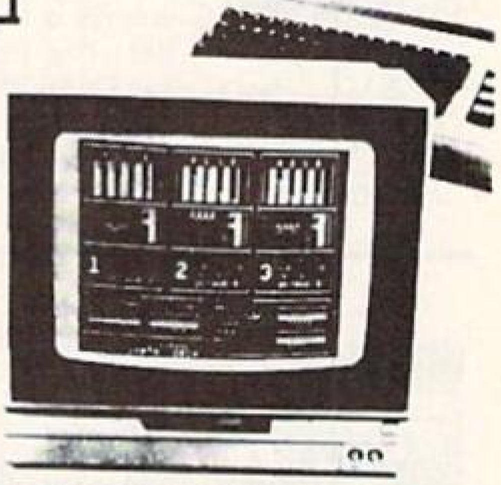
Hi-Resolution!

Now you get this **Fantastic Tech Sketch Computer Light Pen Program** with a **Professional Light Pen Free!** ($39.95 value) plus the **Micro Illustrated Graphics Pen Program** that allows you to draw on your T.V. or monitor screen (better than Gibsons $99 light pen). Whatever you can draw on the screen you can print on your printer (A Tech Sketch Exclusive.) (Disk) List $59.95 **Sale $37.95.**

Also available is **Lite Sprite**, a light pen driven sprite builder (List $39.95 **Sale $29.95**).

MUSIC PORT

The ultimate music synthesizer and multi-track recording system for the Commodore 64. A **Full-sized REAL Keyboard** and all software including printing to the printer and preprogrammed songs are included. (Disk) List $149.95 **Sale $99.00.**



Fully Responsive "MUSICIANS" Keyboard

Sale! $99.00

No
Extra
Software
Required

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American Educational Computer

NEW NEW

• Learn at home • Easy To Use • Colorful Graphics • Motivating and Fun • Teacher Designed

All programs were written by teachers and have been classroom validated. These programs teach in a standard classroom format with rewards as the user gets through the various lessons.

match maker geography
American Educational Computer

(Disk)

US Geography Facts — Has 35 preprogrammed lessons plus an authoring system that lets you create your own lessons. Excellent for teaching and reinforcing factual knowledge of the U.S. After completing two lessons the user earns the right to play a unique and challenging maze game. Fantastic educational value.
List $29.95. **Sale $16.95**.

US Government Facts — 35 lessons plus authoring system included. This program was designed for the following: • Eighth grade American History • Ninth grade Civics • High School electives in government • College refresher courses in government and American History. Fantastic aid to learning about American government.
List $29.95. **Sale $16.95**.

match maker government
American Educational Computer

(Disk)

Commodore 64

spelling
grade 3
American Educational Computer

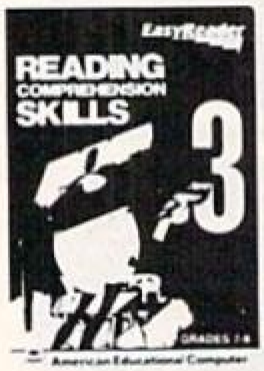
(Disk)

AEC Spelling — A series of seven educational software programs for grades 2 through 8. It teaches the spelling of 4,000 words most commonly used in writing (98% of most people's writing vocabulary). The word lists used are the result of over 25 years of research into the writing/spelling needs of children and adults. Each grade level consists of one two-sided disk with word lists on one side and study activities on the other. The activities are designed to develop mastery in spelling utilizing a Test/Teach/Test approach. A pre-test is used to find out which words a user cannot spell correctly. These are recorded on a "Words To Study" list. The activities for learning these words are provided. Finally, a post-test is taken by the learner to measure progress. The approach is simple and rewards are built in. List $99.95. **Special Sale — 7 programs $34.95**. *Individual programs $19.95. (Specify grades 2-8).*

spelling
grade 6
American Educational Computer

(Disk)

Commodore 64


EasyReader
READING COMPREHENSION SKILLS
3
GRADES 7-8
American Educational Computer

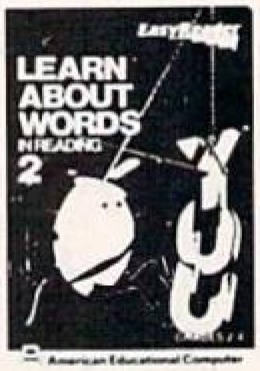
(Disk)

Reading Comprehension Skills — Reading Comprehension Skills, 1, 2, and 3 help the learner develop the ability to read with understanding. The learner does work with cause and effect, similarities and differences, predicting outcomes, finding main ideas, differentiating between fact and opinion, etc.

	List	Sale
Level 1 (grades 1-3)	$29.95	**$16.95**
Level 2 (grades 4-6)	$29.95	**$16.95**
Level 3 (grades 7-8)	$29.95	**$16.95**

Words In Reading (Vocabulary) — Learn About Words In Reading, 1 and 2 teaches the structure of words to ensure success in reading. Such topics as prefixes, suffixes, contractions, synonyms, etc., are among the structural skills included in the program to promote progress and good grades in reading.

	List	Sale
Level 1 (grades 1-3)	$29.95	**$16.95**
Level 2 (grades 2-4)	$29.95	**$16.95**


EasyReader
LEARN ABOUT WORDS IN READING
2
American Educational Computer

(Disk)

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

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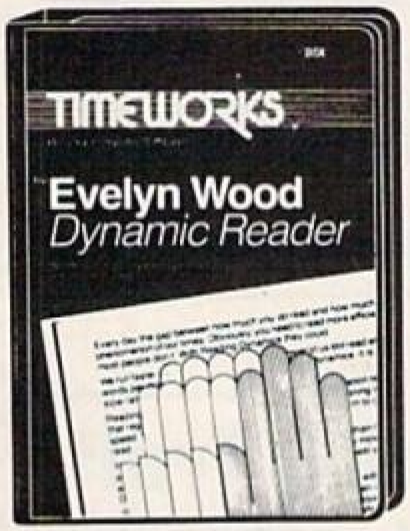
Com-64 TIMEWORKS® Com-64

Evelyn Wood Speed Reading



The EVELYN WOOD DYNAMIC READER provides you with the exercises and tools you need to help you increase your reading comprehension and speed. You can use your own personal computer and develop your skills at your own pace. You can learn the essential techniques of Dynamic Reading in your own home — at any time that is convenient for you. You can repeat exercises as often as you wish to assure that you maintain optimal reading efficiency.

SALE $44.95

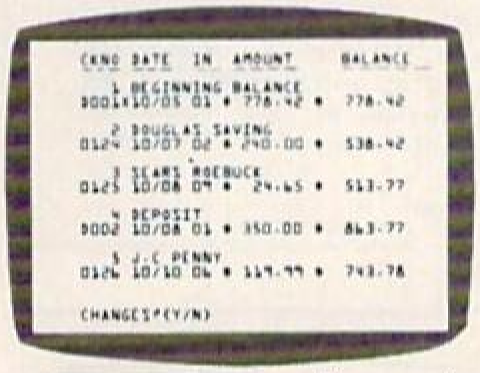
Evelyn Wood *Dynamic Reader*

List $69.95

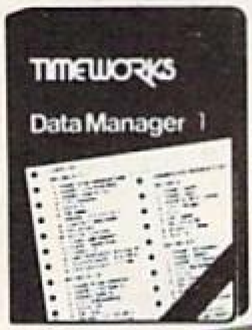
An effective and enjoyable way to
improve your reading comprehension,
retention and speed.

(See Page 29, 30, 54)

Home Management Sale



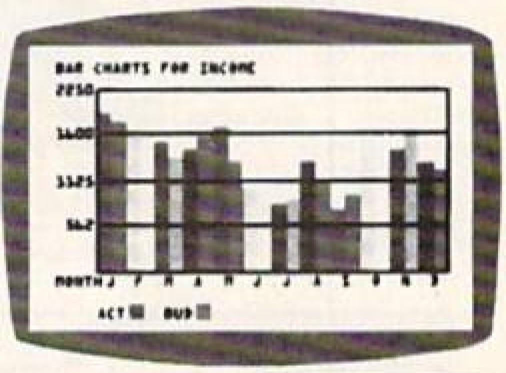
```
CKNO DATE  IN  AMOUNT     BALANCE
   1 BEGINNING BALANCE
0001*10/05 01 * 778.42 *   778.42
   2 DOUGLAS SAVING
0124 10/07 02 * 240.00 *   538.42
   3 SEARS ROEBUCK
0125 10/08 09 *  24.65 *   513.77
   4 DEPOSIT
0002 10/08 01 * 350.00 *   863.77
   5 J-C PENNY
0126 10/10 06 * 119.99 *   743.78

CHANGES?(Y/N)
```

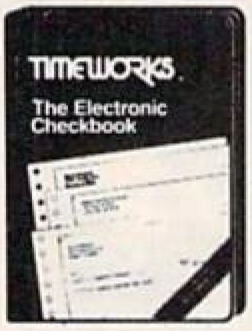


Data Manager 1

A general information storage and retrieval system — with exclusive "X-SEARCH" Feature.

List $24.95. **Sale $16.95.**

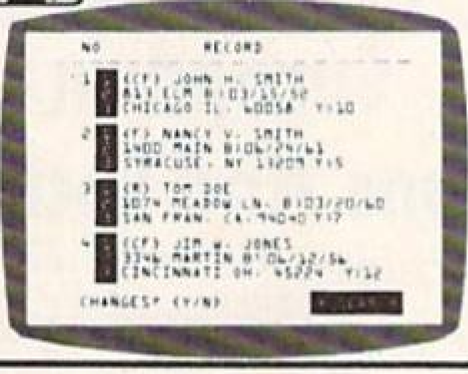




The Electronic Checkbook

Check recording, sorting and balancing system.

List $24.95. **Sale $16.95.**

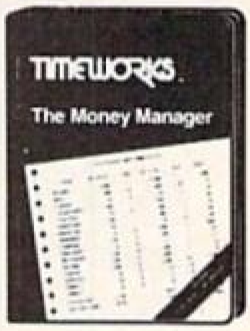


```
NO          RECORD
1  (F) JOHN H. SMITH
   613 ELM B:03/15/50
   CHICAGO IL. 60058  Y:10
2  (F) NANCY V. SMITH
   1400 MAIN B:06/24/61
   SYRACUSE, NY 13209 Y:5
3  (R) TOM DOE
   6074 MEADOW LN. B:03/20/60
   SAN FRAN. CA. 94040 Y:7
4  (F) JIM W. JONES
   3346 MARTIN B:06/12/56
   CINCINNATI OH. 45224  Y:12
CHANGES? (Y/N)
```

The Money Manager

Home and business budget and cash flow system.

List $24.95. **Sale $16.95.**



All three Programs for only $44⁹⁵

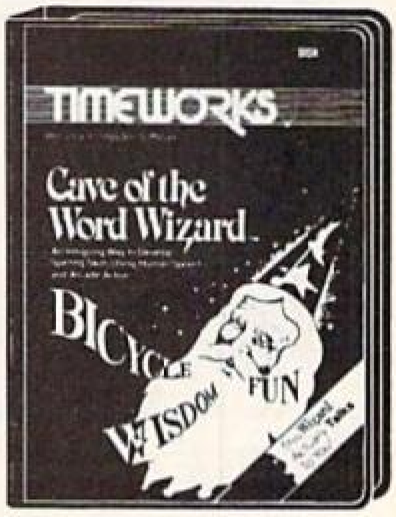
Cave of the Word Wizard

For Commodore 64 Computers

*An Intriguing Way to Develop Spelling Skills
Using Human Speech and Arcade Action.*

This state-of-the-art educational program includes 500 spoken words in 10 spelling skill levels and makes full use of the sound capabilities of your computer. The Wizard will talk to you in clear human speech. No additional hardware is needed for your computer system. (Tape/Disk)

List $39.95. **Sale $22.95.**



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Learning Comes Alive

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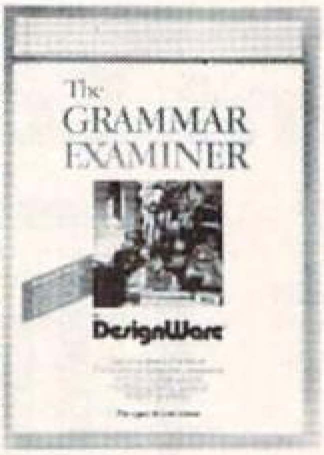
☆ ☆ ☆ ***Real Learning*** ☆ ☆ ☆

Grammar Examiner


The
GRAMMAR
EXAMINER
DesignWare

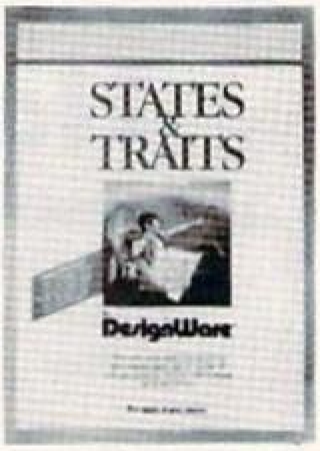
Now you can learn proper grammar as well as spelling. You are required to edit paragraphs or answer grammar questions as you move up the ranks of newspaper reporter. Fantastic learning capabilities. (Grades 5 and up.) (Disk.) List $44.95. **Sale $24.95.**

Spellakazam

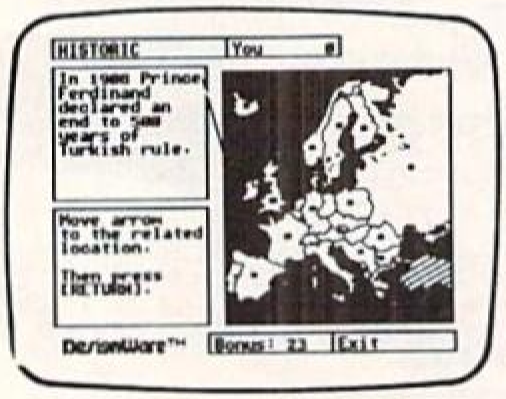
DesignWare
SPELLAKAZAM
The Magical Spelling Game
Ages 7 to 14

Race the magician to spell over 400 prepared words (or enter your own). If you succeed you release the animals, otherwise you seal their fate. (Ages 7 and up) (Disk.) List $34.95. **Sale $19.95.**

States & Traits


STATES
&
TRAITS
DesignWare

Learn about U.S. geography and the famous facts of each state. You must piece states in with only mountains and river. Traits include problems like bordering states and rivers, historical facts, current trivia and capitols. (Ages 9 and up.) (Disk.) List $44.95. **Sale $27.95.**


HISTORIC
You 0
DesignWare™
Bonus: 23
Exit

In 1908 Prince Ferdinand declared an end to 500 years of Turkish rule.

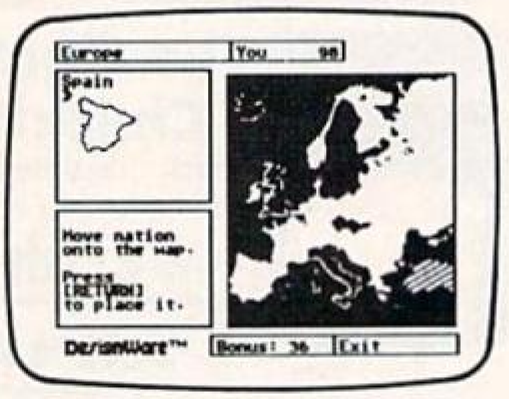
Move arrow to the related location.

Then press [RETURN].

Commodore 64

European Nations And Locations

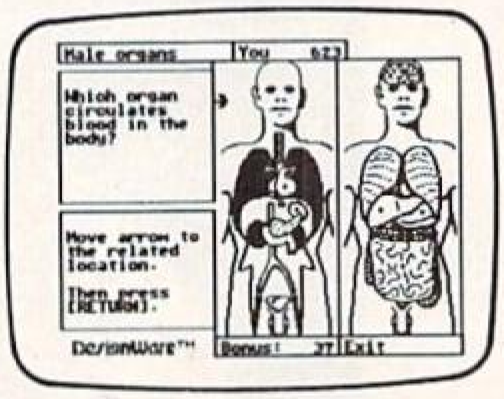
Learn country names, capitals, bordering nations, geographic landmarks, major mountain ranges, rivers and lakes, historical and cultural facts, and where they belong on a map in achallenging and fun game for the whole family. Fantastic way to learn about the countries of Europe. (Disk) List $44.95 Sale **$29.95.**


Europe
You 98
Spain
DesignWare™
Bonus: 36
Exit

Move nation onto the map.

Press [RETURN] to place it.

Commodore 64


Male organs
You 623
DesignWare™
Bonus: 37
Exit

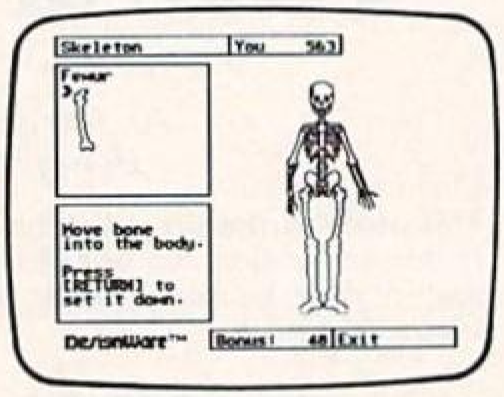
Which organ circulates blood in the body?

Move arrow to the related location.

Then press [RETURN].

The Body Transparent

Teaches the names, locations, and functions of organs and bones in the human body, plus important facts about them. Includes both the male and female body, so you can learn the similarities and differences between them. Move bones and organs to the proper parts of the body and match correct parts to the facts and functions presented. Fantastic education of the Human Body. (Disk) List $44.95 **Sale $29.95.**


Skeleton
You 563
Femur
DesignWare™
Bonus: 48
Exit

Move bone into the body.

Press [RETURN] to set it down.

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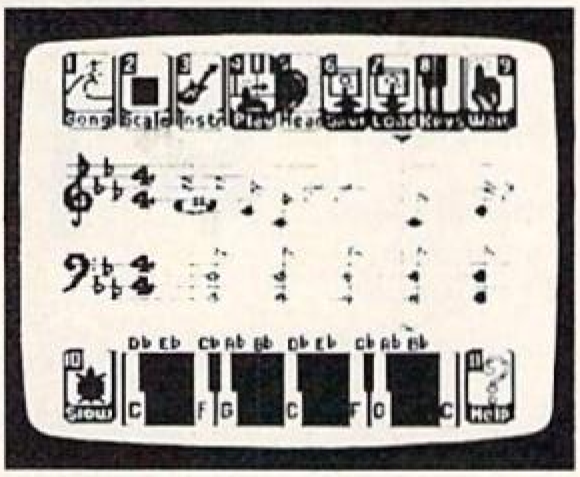
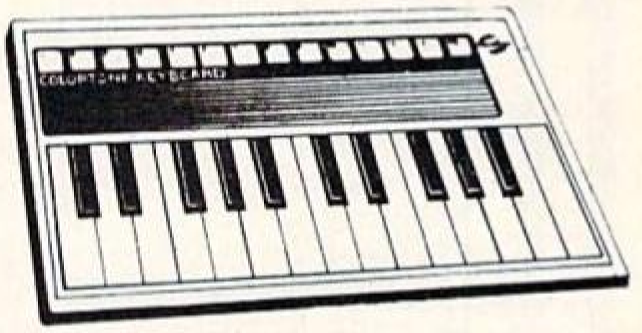
Commodore 64
$29.95 KEYBOARD $29.95

- Play "no-fault" music instantly
- Never hit a sour note
- Play eight different instruments
- Play along with background rhythms
- Make your own music
- Develop musical competence and confidence
- Learn notes on a music keyboard
- Develop sense of rhythm
- Begin learning music theory





ColorTone Keyboard — Now you can play and learn just like on an organ. Just point to one of the colortone's preset songs, change the musical scale you are playing in or make your Commodore 64 sound like one of eight different instruments. As you play, you'll see the notes you're hearing displayed on a musical staff then record your musical creations to listen to them again and again. List $59.95. **Sale $29.95**.

Turn Your Commodore-64 Into A Sophisticated Musical Instrument

"The Program That Gives You A Reason To Buy A Commodore-64."

New York Times.

MusiCalc™

Synthesizer & Sequencer 1

MusiCalc
ScoreWriter 2

MusiCalc
Keyboard Maker 3

Synthesizer & Sequencer

This 1st step turn your Commodore-64 into a sophisticated musical instrument — a three voice synthesizer and fully interactive step sequencer play along with pre-recorded songs or develop your own and record the music you create. (Disk)

List $59.00. **Sale $29.95.**

ScoreWriter

Combine with Musicalc 1 and a graphics printer (Super-10) to produce sheet music from your original composition. (Disk) List $39.95. **Sale $19.95.**

Keyboard Maker

Turns your Commodore-64 into a musical keyboard. Comes with over 30 pre-set keyboard scales from Classical to Rock. Requires Musicalc 1. (Disk) List $39.95. **Sale $19.95.**

With Musicalc **anyone** can • Make and record sophisticated music • Print out sheet music from your creations • Turn your computer into a keyboard • **No experience necessary!**

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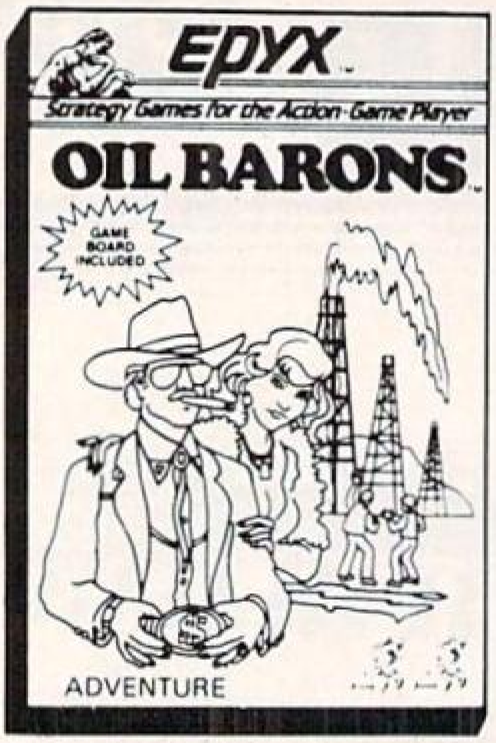

COMMODORE 64

IF YOU'RE SMART, YOU'LL GET FILTHY RICH.

FANTASTIC ADVENTURE — STRATEGY BOARD GAME!

(So good we bought out the factory)

"ANOTHER PROTECTO EXCLUSIVE"

*SALE PRICE ONLY

$19.95

*includes beautiful $8.95 leatherette dust cover for your COM-64 Computer

Factory List Price $49.95*

THE BEST ADVENTURE — STRATEGY BOARD GAME IN THE U.S.A.!

Are you eager for new challenges...ready to pit your skill and luck against others in an attempt to corner the world oil market? If so, Oil Barons is your game.

Starting with 4 parcels of land and over $1 million, you search for that ever-elusive gusher. The computer does all the work, including banking and scorekeeping, freeing you to plan your strategy and make decisions that will ultimately determine your success.

Obstacles like government regulations, well fires, and hurricanes complicate matters, but the fun of increased land holdings, striking it rich, and even unloading worthless parcels on the uninitiated, more than make up for the setbacks.

FOR ALL AGES — Family, schools, businessmen, stockbrokers, oilmen etc. One to eight players, large 4 color game board, over 200 playing pieces, two sided disk and manual in a large colorful box! Keyboard controlled.

Disk Drive Cleaner $19.95

Everyone needs a disk drive doctor

(Coupon Price $16.95)

Facts

- 60% of all drive downtime is directly related to poorly maintained drives.
- Drives should be cleaned each week regardless of use.
- Drives are sensitive to smoke, dust and all micro particles.
- Systematic operator performed maintenance is the best way of ensuring error free use of your computer system.

The Cheetah disk drive cleaner can be used with single or double sided 5¼" disk drives. The Cheetah is an easy to use fast method of maintaining efficient floppy diskette drive operation.

The Cheetah cleaner comes with 2 disks and is packed in a protective plastic folder to prevent contamination. List $29.95. Sale $19.95. **** Coupon $16.95.***

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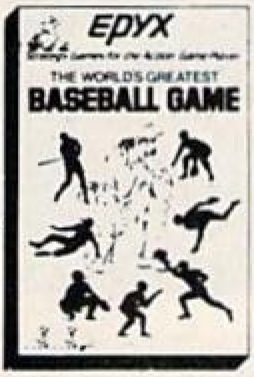
Commodore 64 EPYX™ **Commodore 64**

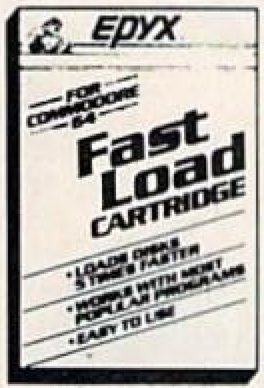
The Best Arcade Games Around

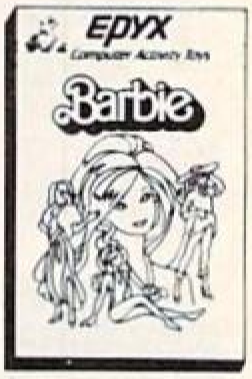


EPYX
LUCASFILM GAMES
Ballblazer

World's Greatest Baseball — Finally a great sports game. Realistic right down to the playing field. Control all the actions even the outfielders. Play realistic baseball all year round. (Fantastic graphics, action, and sound!) (Disk) List $34.95. **Sale $22.95.**

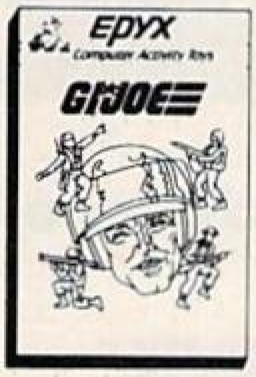
Ballblazer — Unique split-screen, 3-D graphics give you and your opponent a first person view of the field of play. You race across the playfield in your Rotofoil trying to capture the ball and fire it through the goal before your opponent. The winner is the player with the most points at the end of the timed competition. Hold onto your joystick and keep that finger on the fire button, this is the type of two player head-to-head action you've been waiting for. Two Players. (Disk) List $29.95. **Sale $21.95.**

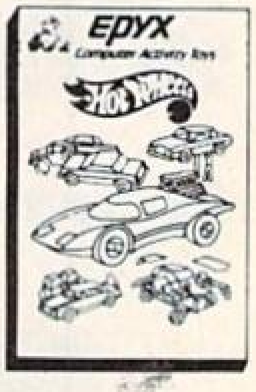




Fast Load Cartridge — Load, save and copy disks five times faster than normal. It plugs into the cartridge port of the Commodore 64 and goes to work automatically, loading disks with ease. And that's only the beginning. It can copy a single file, copy the whole disk, send disk commands, and even list directories without erasing programs stored in memory. (Cartridge) List $39.95. **Sale $24.95.**

Barbie — The biggest name in dolls. Browse through Barbie's closet full of beautiful clothing and dress her for the party. You can cut her hair or make it longer and color it or change the style. Buy new clothing at the boutique or any of the six other specialty shops, or even go to the dress shop and create Barbie's designer clothes with the help of the computer. The combinations are endless and so is the fun. One or two players. (Disk) List $39.95. **Sale $24.95.**

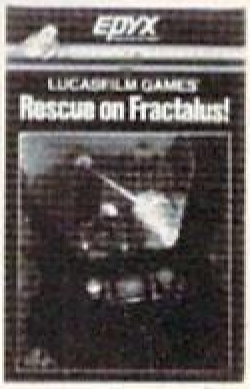




G.I. Joe — The best selling toy soldier is now available as an activity toy on the home computer. Select the battle situation then choose the equipment you think you will need to get the job done. Choose from a number of uniforms and weapons in your well stocked arsenal and get ready for the action. Play alone or with a friend, if you plan the right strategy you will complete the mission if not you will have to try again. One or two players. (Disk) List $39.95. **Sale $24.95.**

Hot Wheels — Now all the action and fun from playing with Hot Wheels cars is taken one step further on the home computer. Hot Wheels lets you choose your play activity from repairing cars to the destruction derby. You can actually play the activities along with a partner on the computer screen, even build and customize your own cars. A whole new way to play Hot Wheels. One or two players. (Disk) List $39.95. **Sale $24.95.**

EPYX
BREAKDANCE



Break Dance — Break Dance is an action game in which your dancer tries to break through a gang of break dancers descending on him. "A simon-like game" where your dancer has to keep the steps of the computer controlled dancer, and even a free dance segment where you develop your own dance routines and the computer plays them back for you to watch. Now anyone can break dance!! (Disk) List $39.95 **Sale $24.95.**

Rescue On Fractalus! — Your mission is to fly your Valkyrie Fighter through the Jaggi defenses and rescue the downed Ethercorps pilots. Sounds easy, but don't let it fool you. It's tough enough jut to navigate the mountains and canyons of Fractalus, but try doing it while destroying enemy gun emplacements or dodging suicide saucers. We supply the Long Range Scanner, Dirac Mirror Shield and Anti-Matter Bubble Torpedoes... YOU supply the skill and guts! One Player. (Disk) List $29.95. **Sale $21.95.**

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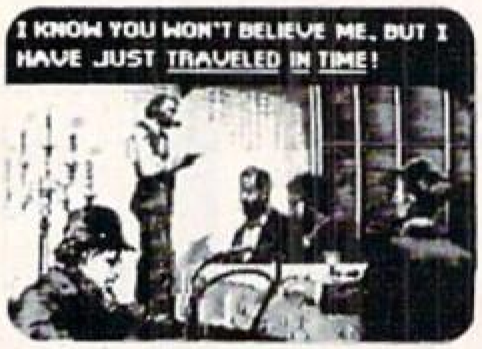
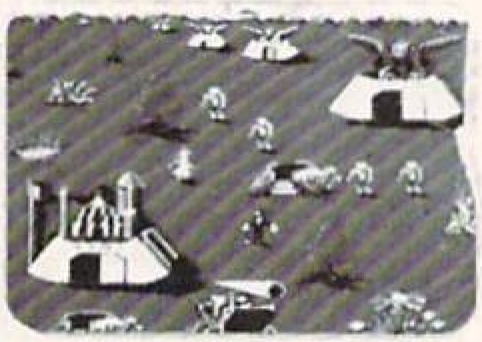
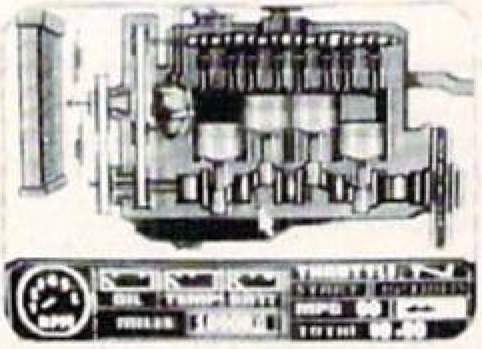

I KNOW YOU WON'T BELIEVE ME, BUT I HAVE JUST TRAVELED IN TIME!

The Time Machine

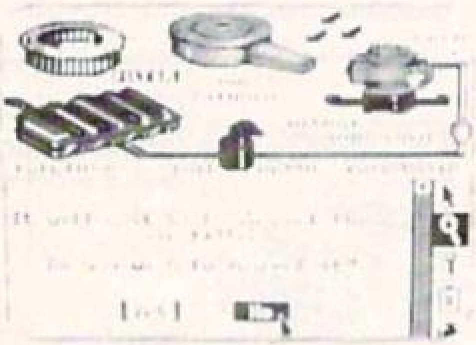
Based on H.G. Wells' science fiction classic, THE TIME MACHINE adds unique joystick action, high-resolution graphics and extensive animation to Wells' ageless prose. Travel through the treacherous time tunnel. Venture into the mysterious land of the future. Befriend the gentle Eloi and struggle to save them from evil Morlocks who lurk in the dangerous underworld. Regain your time machine at all costs — or your tale will end in tragedy! (Disk) List $39.95. **Sale $29.95.**

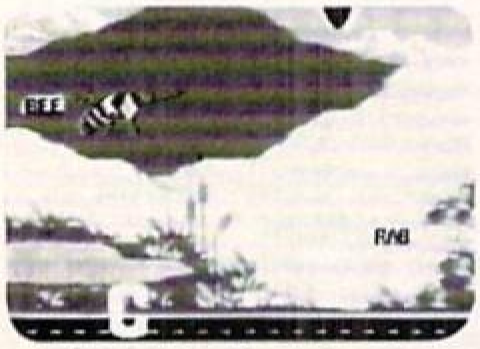




Injured Engine

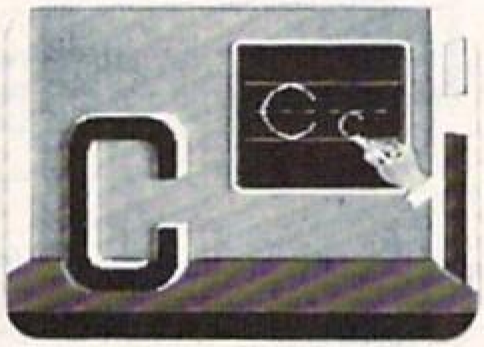
Work with an accurate cutaway representation of a functioning automobile engine. Brilliant graphics detail various engine systems and parts. Learn the names of each part and how it relates to the other parts of the engine, then, use your knowledge to diagnose computer-generated engine problems. Inspect and test at will but remember everything costs! Work against the clock to tune and repair the motor to perfect running condition. (Disk) List $39.95. **Sale $27.95.**



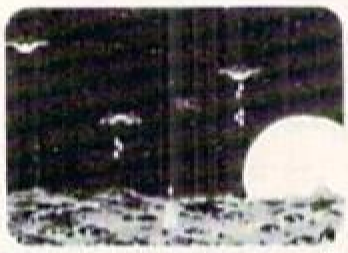


Speak and Seek

It talks!! Speak and Seek teaches the alphabet to children, ages 2-5. It shows children how to print letters in capital and lower cases, pronounces the letter as it is drawn and asks them to find and press the letter on the keyboard. Incorrect answers prompt a variety of helping phrases, such as "Try a little to the right" or "Try higher," and other encouraging and amusing feedback. The make a creature appear that starts with the collect letter. (Disk) List $39.95. **Sale $27.95.**



Commodore 64

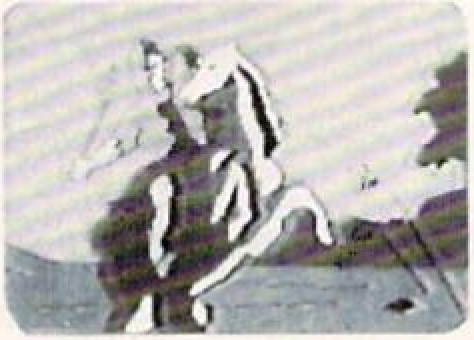


Demon Attack

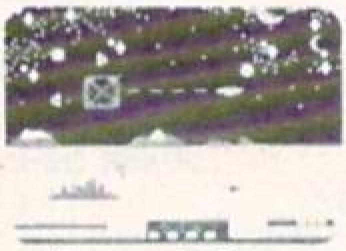
Winged warriors wreak havoc from above! Only your laser cannon stands between you and oblivion! Blast those bizarre demons. Your arsenal includes missiiles and sheer intestinal fortitude. Only the strong survive! (Disk) List $24.95. **Sale $16.95.**

Macbeth

Shakespeare's enthralling play of murder, greed and intrigue comes to life in this startlingly textured and vivid treatment. Armed with your wits, an impeccably detailed edition of the Scottish play and a learned mentor who questions and guides your insights and judgements, the play's the thing for you to solve! An engrossing and educational interactive adventure!. (Disk) List $39.95. **Sale $29.95.**



Commodore 64



Nova Blast

Pilot your own Novon Skysweeper above the underwater city. You must defend four cities in your quadrant from alien assault. Use your radar to detect enemy activity. Race to protect these civilized outposts in a deadly game of skill and strrategy. (Disk) List $24.95. **Sale $16.95.**

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Super Action Software Sale

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BLUE MAX
2001

Blue Max 2001 — Your are Max Chatworth 9th, your mission is to penetrate enemy defenses, destroy their hover fields and finally to destroy the symbol upon which the Furxx Empire is built. The fate of the world rests in your hands. Exciting sequel to Blue Max. (Disk) List $34.95. **Sale $21.95.**

Encounter — An amazingly lifelike simulation of a futuristic tank battlefield, Encounter has only four elements — a grid made of indestructible pylons, enemy saucers, homing drones, and you. Yet these simple components create a challenge requiring total concentration and great skill. Your task — clear the grid of enemies. Success requires a thoughtful balance between sensible caution and raw courage. Keep your cool, accomplish your mission, and you enter another level — eight in all — where enemies become infinitely more clever, and so must you. Encounter is a purist's game, stripped to the essentials. This no-frills approach demands everything you've got. (Disk) List $34.95. **Sale $16.95.**

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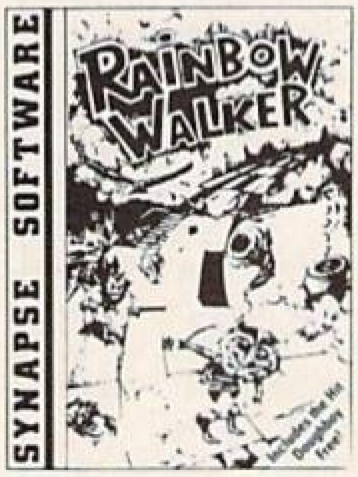
ENCOUNTER!
LI SHIELD 3



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NYC
THE BIG APPLE
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DOUBLE PLAYS

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SYNAPSE SOFTWARE
QUASIMODO
Includes the Hit Warriors of Zypar Free!

Rainbow Walker — Outsmart the devil and a very vicious bird, survive tornadoes and avoid the lightning bolts as the elf hops onto gray squares to create a brilliant rainbow and reach the pot of gold. You'll need razor-sharp reflexes, delicate precision with your joystick and a knack for strategy. Once you start playing, you'll find it impossible to stop.
(Includes Doughboy)

Doughboy — Don't expect DOUGHBOY to be any easier. You'll spend hours trying to outsmart the cleverest opponents while you attempt to recover the supplies that are scattered across the play field. Rocks, trees, trenches and mortars, combined with the dark of night, will surely challenge your wits and skill. Don't let your batteries in your flashlight go dead!
(Disk) List $29.95. **Sale $19.95.**

New York City — You can now visit the Big Apple without leaving home, and you'll soon discover that all the stories you've heard are true! No sooner do you park your car for a visit to some of the most popular landmarks than it's stolen, and that's only the beginning. The subway is sure to make it hard to visit the Empire State Building, Central Park and Grant's Tomb. Metropolitan madness will drive you crazy — especially if you run out of gas or cash, or get hit in the crosswalk!
(Includes Air Support)

Air Support — Air Support is two games within a game providing the player a choice of an arcade game or one of strategy. Control the chopper and robots with a wide variety of commands to choose from. Select the difficulty range, terrain, number of enemy robots, airlift and bombs and begin to accomplish your mission of destroying the enemy robots.
(Disk) List $29.95. **Sale $19.95.**

Quasimodo — Quasimodo is a loner who like hanging out in castle belfries. He also knows the secret hiding place where the royal jewels have been hidden. But, he is too busy stoning the soldiers and swinging from bell to bell to get away from the bats. Only you can help Quasi get the jewels.
(Includes Warriors of Zypar)

Warriors of Zypar — Exciting 3D action makes Warriors of Zypar one of the most exciting two player games released this season. Placed in an arena setting, you will challenge your opponent by trying to knock him off his aero disk. Score extra points by shooting the flying ball into the mouth of the evil ZYPAR. A game that combines the barbaric adventure of the old Roman gladiators with the fast pace concept of soccer and handball all in one. Challenge your partner or your computer and play for hours.
(Disk) List $29.95. **Sale $19.95.**

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BEHIND THE PROGRAMS

BY DAN GUTMAN

The Hitchhiker's Guide to Douglas Adams

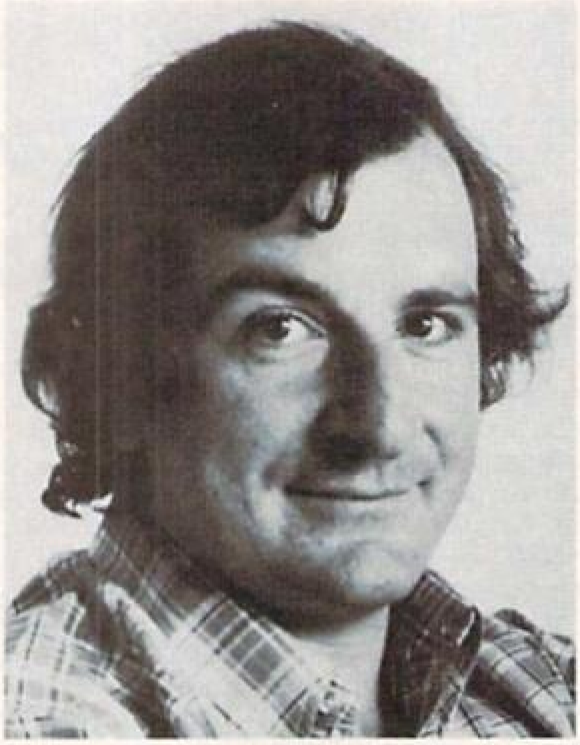
Sixty-four floors above New York City's Rockefeller Center, Englishman Douglas Adams is holding court:

"I want you to know that I really enjoyed working on this game, and I'm not just saying that because I'm trying to sell it. That's only 90% of the reason."

The game, of course, is Infocom's *The Hitchhiker's Guide to the Galaxy*, which Adams co-authored with Infocom's Steve *(Planetfall, Sorcerer)* Meretzky. It's a computer version of the wildly-successful and off-the-wall science fiction book of the same name—the first book by a "name" author to be translated into the new interactive, all-text medium. It is available for $34.95 on disk for the Commodore 64.

Hitchhiker has reached just about every medium this planet has to offer. It started as a 12-part British radio series in 1978 and quickly built up a cult following. Adams made it into a book which spawned two sequels, with a third just published *(So Long, And Thanks for All the Fish)*. Then came the British television series ("For people who need the pretty pictures," Adams says) and two records. There has also been a stage play, and a movie is in the works. But Infocom's computer version is the most intriguing—for the first time in history, a person can read a best-selling book and be a *character* in it at the same time.

According to Douglas Adams, the idea for *Hitchhiker's* came to him one night in Innsbruck, Austria, as he was lying on his back, "slightly drunk, and contemplating the universe." He was on a semester break from college (Cambridge University) and travelling around the Continent with the help of *The Hitchhiker's Guide to Europe*. It was there that he invented Arthur Dent, a hapless Earthling who wakes up one morning to find bulldozers about to demolish his house. Dent quickly learns that there is a bigger demolition about to occur—the demolition of the entire planet. With the help of his friend Ford Prefect, Dent hops a ride on an "Electronic Thumb" and hitchhikes the galaxy.



Adams says writing interactive fiction is like writing for radio. Both use the imagination of the reader/listener in place of pictorial description.

After the success of the radio series, books, TV show, record and play, Adams spent about a year exploring ways to transform *Hitchhiker* into a work of interactive fiction. He also became a big fan of Infocom games.

"I started to work on a word processor, and like most writers, I began to discover all the other things that computers can do—which is why you end up day after day with nothing much written. One of the great aids I found to *not* writing was Infocom games. As soon as I started to play them I thought, 'Here are a set of minds similarly afflicted.' "

Mark Blank, Infocom's vice president of product development (and author of *Zork* and *Deadline*), was a big fan of *The Hitchhiker's Guide to the Galaxy*. "Imagine our surprise when Doug Adams walked in one day and said he's been playing our games for awhile and wants to work on one. We were totally floored," Blank remarks.

Blank teamed up Adams and Meretzky, no small task considering that Meretzky lives in Massachusetts and Adams lives in England. The two hooked their computers up via modem through the Dialcom computer network and began sending electronic mail back and forth.

"Doug would write detailed chunks of material and send them by modem," says Meretzky. "I'd transcribe the material directly onto a disk in my computer. In the same way, I would send Doug portions of the game as programming was completed."

In June, the two got together in England to put the finishing touches on the game. It was then debugged on Infocom's 36-bit DECSystem 20/60 mainframe computer and translated for every microcomputer.

Writing interactive fiction is very different from writing traditional fiction. Infocom's Mark Blank thinks it's harder. "It's not just a matter of translating stories," he says. "Our recent *Seastalker* game was written by Jim Lawrence, who had ghosted 50 or 60 Hardy Boys and Tom Swift books. He wanted to write a story that went from point A to B to C, and we kept saying that you have to think in terms of a story where the characters have alot of *different* possibilities. We really had to train him alot."

Douglas Adams, though, finds interactive fiction to be *easier* to write than traditional fiction. "I found it very conducive because my mind happens to work in that way. You need a particular bent of mind to do it, and I *do* mean bent."

"There are a number of things that are easier," Adams explains. "You don't have to write a 'seamless garment' for a game like you do in a book. When you write a book, you may know how one section goes and how the next section goes, but actually connecting them is very difficult. In an all-text game, the *reader* is supplying the connections between those pieces of text."

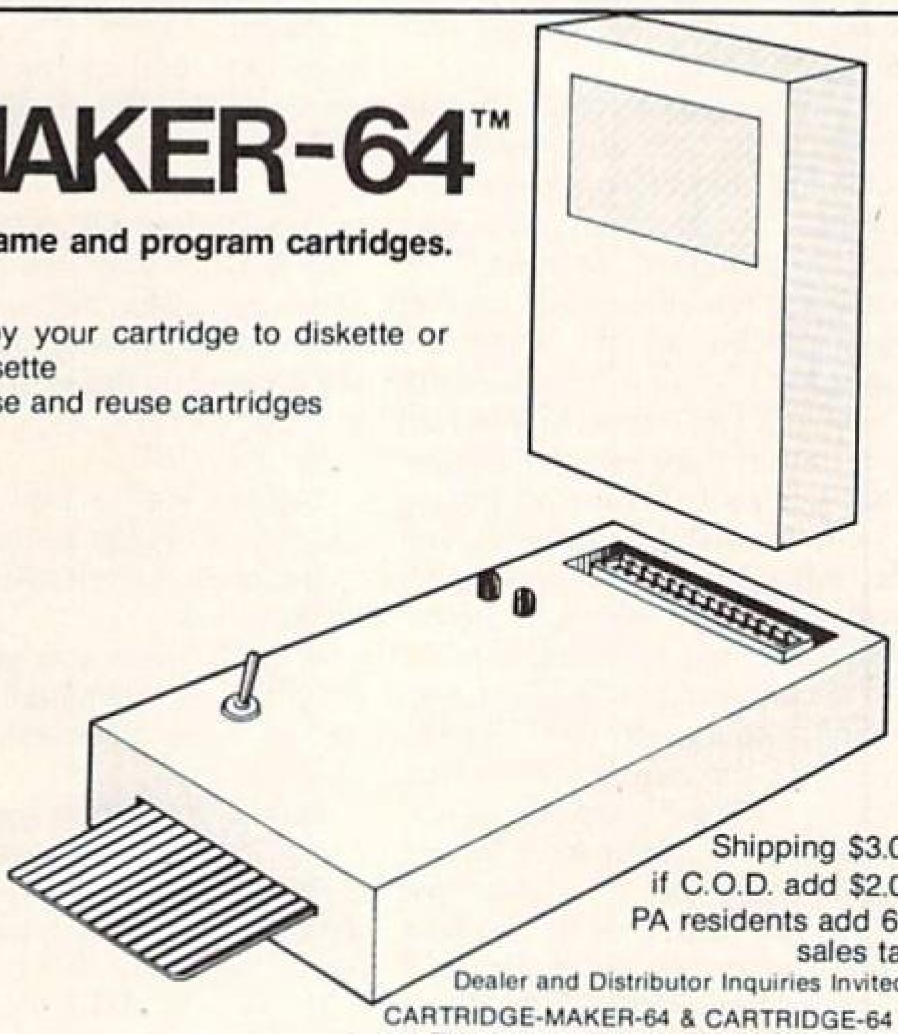
Adams says writing interactive fiction is like writing for radio. Both use the imagination of the reader/listener in place of pictorial description. "There's a famous remark much quoted in England about a little boy who is asked which he prefers—radio or television. He says he prefers radio because the scenery is better." Blank agrees: "Novels are not necessarily helped by graphics. You can actually build the best pictures of the world in your mind."

All-text computer games are not new, but with the exception of Infocom's, they have been a disappointment, according to Douglas Adams. "With most of the games, I was very much aware of the fact that they were written by computer people who had branched out into writing. I wanted to be one of the first to come from the *other* side of the tracks. While I was writing the game, I frequently had the feeling—'I don't think anybody's ever *done* this before.' It's very exciting working with this new medium, and I'll be pursuing it further." In fact, Adams and Infocom are at the "let's-talk-about-it" stage of another game that is being conceived purely as a game to begin with.

> *There's no doubt that interactive fiction is, as Infocom claims, "a new art form" in its infancy. Other big name authors will almost certainly jump on the interactive bandwagon. Will we see the day when conventional literature will be replaced by interactive literature? Is print dead?*

There's no doubt that interactive fiction is, as Infocom claims, "a new art form" in its infancy. Other big name authors will almost certainly jump on the interactive bandwagon. Will we see the day when conventional literature will be replaced by interactive literature? Is print dead?

"Absolutely not," according to Douglas Adams. "When radio came out, everybody said books will disappear. When television came out, everyone said that radio will disappear. It was the same when movies came out. People find new ways of enjoying themselves. There's something about the experience of a book which nothing else will ever replace. You can't take a computer game on the train. Interactive fiction is different and it's great to have it aboard, but it doesn't mean anything else has got to be thrown out." C



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BY DAVID R. BROOKS
AND SUSAN G. CAUGHLAN

What Next for David Simons?

Here's a short story, a modern folk tale of the computer industry.

Long, long ago, a fantastic new personal computer was developed. It had lots of memory, advanced graphics and a new sound-synthesis chip. The manuals hinted at the hidden wonders: a PEEK here, a POKE there. Clearly, this machine was going to demolish the competition.

But there were no graphics commands, no sound commands, no programming tools built in. The beginning programmer was bewildered. Then, from a small suburb of London, a boy of 16 emerged with help. He wrote a program to give this new machine the voice it deserved; its programming power was unleashed.

You may well recognize this mostly true story. The machine is, of course, the Commodore 64. The boy is David Simons, creator of *Simons' BASIC*, Commodore's extended BASIC language for the 64.

While in London recently we had the opportunity to meet David Simons. Our interview was arranged for what turned out to be a typical gray Friday afternoon in August. The crowded outskirts of northern London changed quickly as our commuter train headed north for the short trip from King's Cross station. Backyard gardens became neater and the orange-tile roofs of urban row houses gave way to rolling farmland and wooded countryside.

David met us at Welwyn Garden City station in his company car and drove us a short distance to his family's home in this neatly laid out post-World-War-II community. We found David to be pleasant, easy going, and, by now, used to being interviewed. We think it's only fair to indicate that our questions and David's answers presented below are a distillation of our conversation, rather than direct quotes. We started off with the obvious question:

Brooks & Caughlan: How did you happen to write *Simons' BASIC*?

David Simons: Well, in 1979 I began working with a Commodore PET that my father borrowed from his company. I started by writing some games in BASIC, but I soon became interested in overcoming some of BASIC's limitations by writing in machine language.

B & C: What sort of limitations?

David: Things like speed, screen scrolling, and graphics that just weren't possible with BASIC.

B & C: You were about 14 at the time?

David: Yes, I'll be 19 in October.

B & C: We've heard it said, with some cynicism, that any reasonably bright kid with large amounts of time to kill could do the kinds of things you did. Did you in fact spend lots of time programming?

David: Well, at first I had the PET only on weekends, but later I was able to get one on permanent loan, which helped a lot.

B & C: Once you started writing programs in machine language, how did the idea of an extended BASIC develop?

David: Over the space of several months, I worked at developing BASIC commands from the machine language routines I had developed. These originally had to be accessed with SYS or USER commands. My father had some contacts at Commodore because he was buying Commodore products for his company. Through those contacts I was able to get some articles published in CPUCN magazine, which was published by Commodore for U.K. user groups. That was about the time of the first London Commodore Show. Then I wrote a package called Apfelgraphics, because I was trying to duplicate some of the graphics features of Apple BASIC. *[Note from Brooks & Caughlan: CPUCN no longer exists, and we never did find out what the letters stood for.]*

B & C: It was then that Commodore took some interest in what you were doing?

David: Yes. By 1981 I had written an extended BASIC for the VIC 20, which I demonstrated for Commodore at the London Commodore Show. Just then they were coming out with the Commodore 64. They realized that its BASIC had some serious shortcomings, so they gave me a prototype and asked me to write an extended BASIC for it. [*The extended BASIC David wrote for the VIC 20 was never released.*]

B & C: Let's talk a little bit about the features of *Simons' BASIC*. It's intended to be a more modern and structured form of BASIC than the BASIC supplied with the 64.

David: Yes. I was influenced alot by Hewlett-Packard BASIC and by the BBC microcomputer that's used extensively in British schools and has alot of structured commands. Of course, the other big problem with the 64 is that it doesn't have any BASIC commands for accessing the graphics capabilities or the SID [sound interface device] chip. *Simons' BASIC* addresses all these problems, adds several mathematical functions and finally adds some programming tools like line renumbering. Altogether it adds 114 new commands to the 64's BASIC language.

B & C: One minor criticism we've heard of *Simons' BASIC* is that the renumbering command won't work for statements following GOSUB's, GOTO's, or THEN's. Was this deliberate, as a way to avoid these constructions in structured programming?

David: Well, of course you're right that structured BASIC programs shouldn't need these constructions, but the real reason was that a renumbering command that just picks line numbers from the beginning of BASIC statements is alot easier to write and takes alot less space than one that can handle all those other cases.

B & C: So, you were getting *Simons' BASIC* into final form about the time you turned 16. Did you do it all yourself?

David: I wrote the machine code and Commodore worked out the details of the cartridge package. There was some give and take about what features to include. Generally, when they made suggestions, I tried to implement them. Also, Commodore's own technical writers were responsible for the manual.

B & C: We know that *Simons' BASIC* has been very successful. Have you made a lot of money?

David: It's been a substantial sum, but I'd rather not say exactly how much. I will tell you that I get about five percent on the warehouse [dealer wholesale] price. In the U.K. this works out to about 1.50 per unit.

B & C: How did you go about handling what we assume was a very unusual financial success for someone your age?

David: I started my own company, D. S. Software Limited, when I was 16, the minimum legal age for that in Britain. Even though I could handle the company's affairs on my own, I couldn't get a bank card [these are required as check-cashing identification in Britain] because at my particular bank, the card doubles as a credit card, which couldn't be issued until I was 18. So, for a while, it was a bit frustrating. My father helped a lot with the business deals.

> Simons' BASIC *addresses all these problems, adds several mathematical functions and finally adds some programming tools like line renumbering. Altogether it adds 114 new commands to the 64's BASIC language.*

B & C: Your company still exists?

David: Yes, it's very useful for tax purposes. For example, I can get a refund on the VAT when I purchase computer equipment. [*The value-added tax, common in most European countries, is like a national sales tax that's always included in the retail price of goods. In Britain, the VAT on computer equipment is currently 15%.*]

B & C: And your car?

David: Yes, it also belongs to the company.

B & C: Are you still doing work for Commodore?

David: Yes. As soon as I finished *Simons' BASIC*, I started work on an extension for it. It has several new features and addresses some complaints about the original version.

B & C: Like the renumbering command?

David: Exactly. With the new version you'll be able to renumber all your old programs, complete with their unstructured GOTO's! The extension has more and better sprite commands, including collision detection and the ability to set direction vectors so your sprites can continue to move as the program runs. The music commands now include filter controls. There was a need for an easy way to provide audible feedback in response to keystrokes or to indicate that a particular place had been reached in a program. So, I added a BEEP command that you can use without getting involved in all the decisions you would make for a musical sound. To use the extension, you first have to have the *Simons' BASIC* cartridge in place and then soft load the extension from tape to disk. Altogether, it adds 91 more commands. Through some clever manipulations with memory allocation, the new version takes only about 2K more memory than the original one. *Simons' BASIC* leaves you with about 30K of BASIC program space, but with the extension, you still have about 28K available. [Simons' BASIC extension *is currently available in the U.K. on either tape or disk for a list price of £19.99. This was not available in the U.S. at this writing.*]

B & C: What else are you working on now?

David: I must say that the market now makes it very hard for writers and producers of software to make good decisions about how to spend their time and money. When I wrote *Simons' BASIC*, it was for a new machine that had an obvious need for an extension to its language. These days, the types of extensions I wrote would have to be included in any newly released computer. And, there's a trend toward including other programs like word processors and spreadsheets in the original price of the computer. When these programs are already built into the machine, potential software writers can't just start writing the obvious software they know purchasers of the machine will be wanting.

Another problem is that the market is becoming saturated with games and other programs. These are easy to duplicate, either by copying them outright or by waiting a while and ripping off the best ideas. This dilutes the market for the original writers of the best software. It's very frustrating, and makes it very hard to see where the incentive is. I think it would be extremely difficult now for any individual, including myself, to duplicate the achievement of *Simons' BASIC*.

Still another problem is that the uses to which computers will be put by nonprogrammers is still very uncertain. Will large numbers of people really run their personal affairs or

Continued next page

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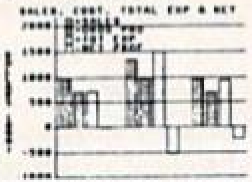

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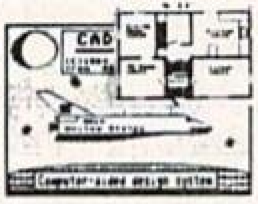

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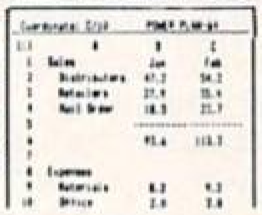

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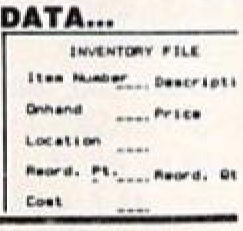

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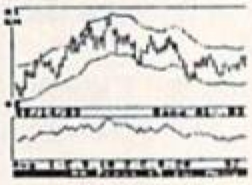

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businesses with spreadsheets? Will there be an expanding market for home appliance controllers? I just don't know, but I do know that it makes it tough to decide what to do. I guess that if I could really figure out what would be successful right now, I'd keep it to myself!

B & C: We'd like to get your comments on British computer magazines, of which there seem to be many more than in the States.

David: I think a problem is that there are lots of magazines here, but too few independent publishers. For example, if you read lots of favorable reviews of a product, you may think that many different authors and their publications think it's a really great product. But in fact, the reviews may be produced by only a very few publishers and a very small number of reviewers. This makes it very hard for users in the U.K. to make good buying decisions.

B & C: What about books on machine language programming? There seem to be lots of them, but machine language programming is still very hard for a beginner to learn.

David: The problem is that it doesn't do much good to describe the machine language commands, or even how to use them. What you really need is a feeling for what you can or have to do to reach a particular goal. I think lots of books have tried to reach this skill, but haven't yet succeeded. The best way still seems to be to look at other people's machine language programs and try to figure out why they did what they did.

B & C: Have you considered doing some writing yourself?

David: No, I don't think I have much talent for good writing. That's a skill that's really hard to learn, and it doesn't pay very well, either!

B & C: So, what are your plans for the immediate future?

David: I've just finished my sixth forms [the equivalent of graduating from high school]. I'm going to take a year off and then go to a university, perhaps to major in cybernetics.

B & C: Well, we want to wish you the best of luck with your company and your future plans. It's been a great pleasure to meet you, and we look forward to seeing more Commodore products from you. ■

PREVIEWED BY STEVE FINKEL

Micro Astrologer: Astrological 64-casting

Computer: Commodore 64
Publisher: Commodore Business Machines, Inc.
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West Chester, PA 19380
Medium: Disk

Alarm sounds. Turn it off. Roll over. Leave bed. Brush teeth. Get newspaper. Check horoscope. Decide after reading horoscope: face the world or go back to bed.

Newspapers are alright for supplying your daily astrological forecast, I suppose. Considering that your horoscope can be interpreted as the overriding guide to your daily behavior, doesn't it strike you as odd that everybody else in your town born under the same sign you were would have the exact same forecast? What are the chances that their lives, circumstances and situations should coincide with your own to the degree that the sage advice derived from the heavens fits them as well as you?

And in some areas, they have only an evening paper. You have to wait until the day is nearly over to find out what your horoscope is (was). It does not bode well if you sign a multi-million dollar deal with a Florida-based real estate development agent specializing in swamp reclamation to find out later in the day that your horoscope advises against entering into any major business deals.

So there are the two major problems with newspaper horoscopes: they do not address *you* as an individual and they are not always available when you want or need them.

It doesn't have to be this way, however. One option would be to make regular appointments with a medium who, for a substantial fee, would give you personalized readings. Perhaps the seer would really be a knowledgeable forecaster, but could easily be making it up as he or she goes along or even reading it out of the newspaper. There must be a better way to spend a hard-earned buck.

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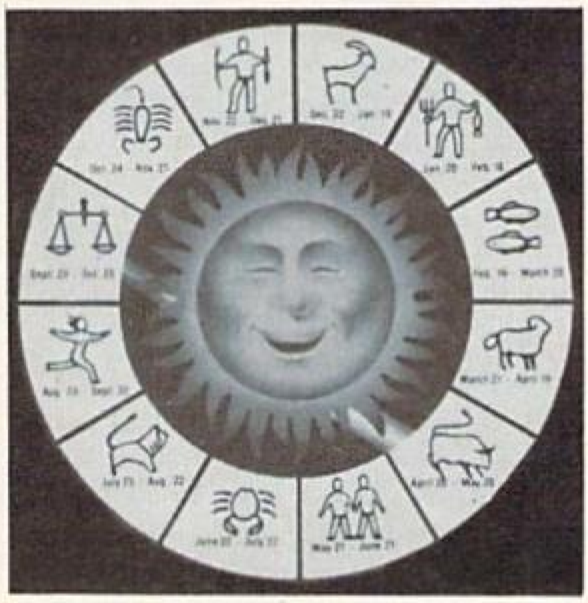

Here's one of them: you can determine your own astrological forecasts any time using *Micro Astrologer* on your personal computer (and that's Personal with a capital P). With *Micro Astrologer*, you can make your readings based specifically on relevant data and precise calculations that pertain directly to you. *Micro Astrologer* gives you the luxury of forecasting whenever the need arises, wherever you can set up your Commodore 64.

While astrology is far from an exact science, the power of the 64 enables a thorough analysis based on thousands of complex factors generated through the history of astrological research. With *Micro Astrologer*, you can perform two different types of horoscopes: natal (birth) horoscopes and transit (daily or monthly).

The natal horoscope is based on the time, date and place of your birth as well as the astrological factors in effect at that time. Your natal horoscope is a kind of overview "personality reading." The *Micro Astrologer* natal horoscope describes your general characteristics and stresses your important features, based on information derived from the relative positioning of the planets. Also, the astrological data that the interpretation was derived from is revealed, so you can find out if the moon was in the seventh house and Jupiter aligned with Mars. These factors are explained in the manual and are easily understood with the background information given.

Transit horoscopes are those you might follow day-to-day in the newspaper. Some people might accept the "advice" given in a transit horoscope as gospel, but *Micro Astrologer* does explain that while a precise astrological analysis is possible using your information, the key element is you. Interpreting the stars can give you indicators and a framework for your actions, but you are still responsible for your own behavior. With that aside, you can indeed take readings for yourself and for others as their daily and monthly horoscopes. This type of horoscope is based on "transits"—the current planet positions and movements relative to your birth sky. Transit horoscopes can be forecast for a single day or an entire month period. The daily horoscope takes into account short-term transits, while the monthly horoscope is based on long-term transits. As you might expect, these horoscopes deal with day-to-day or week-to-week events and feelings.

Micro Astrologer is a disk-based program, and lets you store and print out the horoscopes and data. The results of your analyses are delivered in understandable English, open to your own interpretation. While the tie between the influence of the stars and our own behavior is one which we do not yet completely understand, *Micro Astrologer* can deliver a horoscope that is rare in its completeness. Whether you believe in the accuracy of astrological forecasting or not, *Micro Astrologer* is an entertaining, easy-to-use program that lets you forego the morning paper in favor of your 64-cast. ■

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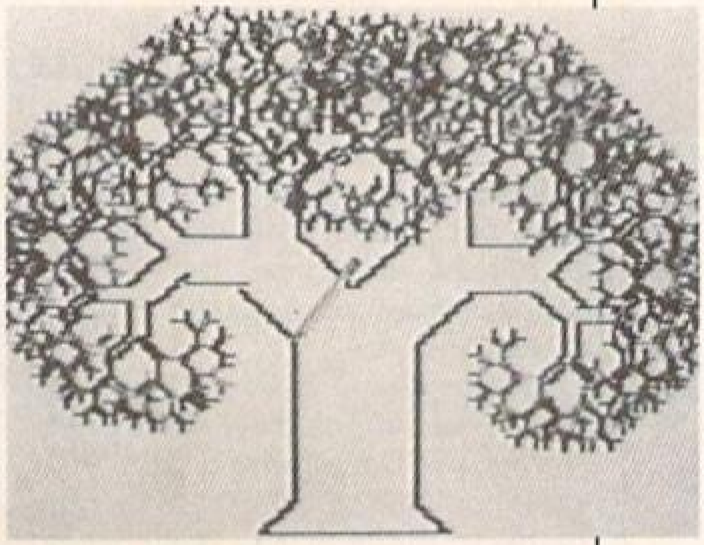
SOFTWARE REVIEWS

REVIEWED BY ERVIN BOBO

Designer's Pencil

Computer: Commodore 64
Publisher: Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
Medium: Disk

> Designer's Pencil *gets a high mark. It is one of the few graphics programs available that doesn't require a light pen.*



Activision has finally brought their talents to the home computer arena! You've seen computer translations of their popular video games on the shelves of your favorite software store, but *Designer's Pencil*, a graphic program used with a joystick and keyboard, is a new approach for them.

After booting the disk, you're treated to several sample program executions and, like me, you can't help being impressed. Pressing the space bar stops the demos and gives you the programming screen.

The programming screen is divided into four parts. At the top left is a prompt window, allowing access to I/O routines such as loading, saving, and viewing the disk directory. Below it is the programming area, where your selected commands appear. To the right is the instruction area, where all available programming commands are located.

To write a program, use the joystick or function keys to move an arrow cursor until it points to a command. To select that command, simply press the fire button or the space bar. Once you've assembled commands into a program, go to the bottom of the screen where all Master Commands are listed. At this point, view, run, insert lines, delete lines, file or clear the program.

Command syntax, such as "Pencil on," "Go up 000," "Go right 000," "Circle 000," will be familiar to those who have used a LOGO package. The difference is in program execution: *Designer's Pencil* is much faster.

The instruction book also outlines instructions for creating music and sound. Same routine: select the sound command from the instruction window. You read that right—one command for sound, plus a chart of note values in the back pages of the book. Experimentation is called for here. In fact, Activision encourages you to experiment even before reading the instruction book—rather a novel way to greet a new program.

In execution, the screen clears and a stubby yellow pencil begins drawing according to the commands you've selected. Speed of execution is selectable on a scale of zero through 15. I found that four is plenty fast for most purposes.

I really like the "kaliedoscope" commands. Turning on the kaliedoscope causes your design to be replicated four times on the screen. Neat.

As an original computer effort from Activision, *Designer's Pencil* gets a high mark. It is one of the few graphics programs available that doesn't require a light pen. ▪

BY KATHERINE MYERS

Program Boot for the Commodore 64 and Disk Drive

Here is a program that will let your Commodore 64 BASIC programs start running automatically when they are loaded into the computer.

The first thing to do is type in "Pro Boot" and save it. The data statements are for machine language programs so it is important that they are typed in accurately or your computer may crash when this program is run.

To convert a BASIC program into one that will boot up automatically, load in "Pro Boot" and run it. It executes the NEW command in line 15 so you are now ready to load in your program. After you have done this, type in direct mode:

POKE43,18:POKE44,3

Hit the RETURN key and you are now ready to save your program (use a different title if you are saving to the same disk that the original is on). You may also verify for extra assurance. Now press RUN/STOP RESTORE (to change back some important vectors) and type the following line in direct mode:

POKE43,1:POKE44,8

This puts the vector that points to the start of BASIC program space back to normal.

Your program is now ready to load and start running without the user having to type RUN or use the old SHIFT-RUN/STOP method. One important thing to remember is to load the program with a secondary address of "1" (LOAD"PROGRAM NAME",8,1) so that the program will locate itself at the address from which it was saved. (Commodore computers automatically load a program at the start of BASIC unless this secondary address is used.)

The way this program works is rather simple. Locations 794-819 in the computer contain some addresses for Kernal routines that are used by BASIC. One of those vectors (804-805) points to the CHRIN routine which is called when BASIC is waiting for input from the user. Every time you see the word READY and a flashing cursor (like after you load a program), CHRIN is the routine that is operating. "Pro Boot" changes that vector to point to a machine language routine that was poked into the cassette buffer.

Since your program has now been saved along with the cassette buffer and the CHRIN vector, the operating system will now go to our ML program instead of the normal CHRIN routine. Basically, the ML program checks to see if a relocated LOAD has taken place. If it has, it starts the BASIC program running by using the dynamic keyboard technique to make the computer think the user has typed RUN.

When you are using this program, you may notice that something strange happens when you type SAVE or VERIFY. After you've typed either command and hit RETURN, the screen clears. Also, the normal messages (SAVING and VERIFYING) don't appear. This was done because the normal screen area (1024-2047) is being saved with your program. If the screen didn't clear and these messages appeared, you would always get a VERIFY ERROR since the values in the screen matrix would be different from the time you saved to the time you tried to verify.

When you are using "Pro Boot", don't press RUN/STOP RESTORE until you have completed saving and verifying the new version of your program. If you execute RESTORE, the changed vectors will return to normal and the program won't function properly so you'll have to start over.

This is the easiest boot program I have seen. It's not much more difficult to use than a normal SAVE. I like it because it allows verifying (unlike the boot-making programs that write directly to the disk) and doesn't require saving a lot of unnecessary memory (like those that use the stack). If you want to protect your programs from being listed, just add POKE 808,234 to the first line of your BASIC program. This disables the RUN/STOP key so the user won't be able to break out of the program without turning off the computer.

Program Boot

```
10 FOR I=828 TO 928:READ A:POKE I,A
   :T=T+A:NEXT'ISPG
11 IF T<>11753 THEN PRINT"[CLEAR]
   ERROR IN DATA":STOP'GHDH
12 POKE 184,0:FOR I=0 TO 2
   :POKE 785+I,0:NEXT'HRDG
15 POKE 804,60:POKE 805,3:POKE 816,143
   :POKE 817,3:POKE 818,129:POKE 819,3
   :NEW'HQAO
100 DATA 165,184,201,1,240,3,76,87,
    241,169,87,141,36,3,169'BYFF
105 DATA 241,141,37,3,169,165,141,48,
    3,169,244,141,49,3,169'BADK
110 DATA 237,141,50,3,169,245,141,51,
    3,169,1,133,43,169,8'BXWF
115 DATA 133,44,169,82,141,119,2,169,
    117,141,120,2,169,13,141'BCHL
120 DATA 121,2,169,3,133,198,108,2,3,
    72,169,0,133,157,169'BXYG
125 DATA 147,32,210,255,104,76,237,
    245,72,165,10,240,9,169,147'BDVM
130 DATA 32,210,255,169,0,133,157,104,
    76,165,244'BOLG
```

BY CHARLES MOEHRINGER

BASIC Renumber

When writing or modifying a BASIC program, it may become desirable to renumber the lines to ease insertion of new lines. Commodore's excellent software package, *Simons' BASIC*, contains a RENUMBER command that does this but I did not find this command particularly useful. The *Simons' BASIC* RENUMBER command does not change the line numbers after control commands like GOTO, GOSUB, and ON—GOTO statements to match the renumbered lines. After the lines are renumbered by the RENUMBER command, you have to go back through the program and change the line numbers after the control commands manually, a tedious process.

Here is a combination BASIC and machines language program which will renumber BASIC program lines on the Commodore 64 *and* also change the line numbers after the control commands. The program is written in two parts. Listing 1 is a BASIC machine language loader which sets up the machine language routines and also loads the other BASIC portion (Listing 2). Listing 2 controls the logic flow of the renumbering process. Most of the work is accomplished by the machine language routines which speed things up considerably.

Type and save both programs separately. Make sure that you give Listing 2 the file name RENUMBER-BASIC. When you are ready to renumber a BASIC program that has already been saved, just turn on your Commodore 64, load in Listing 1, type RUN [RETURN] and follow the instructions.

The program will ask for the file name of the program to be renumbered, the first line number desired and the increment desired. When the final READY prompt appears, type LIST [RETURN] and you will see your BASIC program renumbered as you desired. You can run or save it at this point although I suggest saving it first.

The maximum length of a program that can be renumbered is about 36K. This does not include numeric and string variables generated by the program so it should be possible to renumber almost any program.

Make sure that the program you are renumbering was originally saved from the normal start of BASIC (location 2048 decimal or 0800 hex). If your program was not saved from this location, it will not be renumbered.

Do not expect fast results. It will take about eight minutes to renumber a 12.5K program. Your Commodore 64 has a lot of work to do while going over and over your BASIC program.

One of the most useful aspects of this renumbering process is that it can act as a program cruncher. I have found that if I renumber a long program, about 15K or longer, with a first line of one and an increment of one, I can save about 1K of memory space. This is because of the shorter line numbers after the control commands in the program. However, if you do renumber your program like this, it will be very difficult to modify it afterwards. **C**

Listing 1. ML Loader

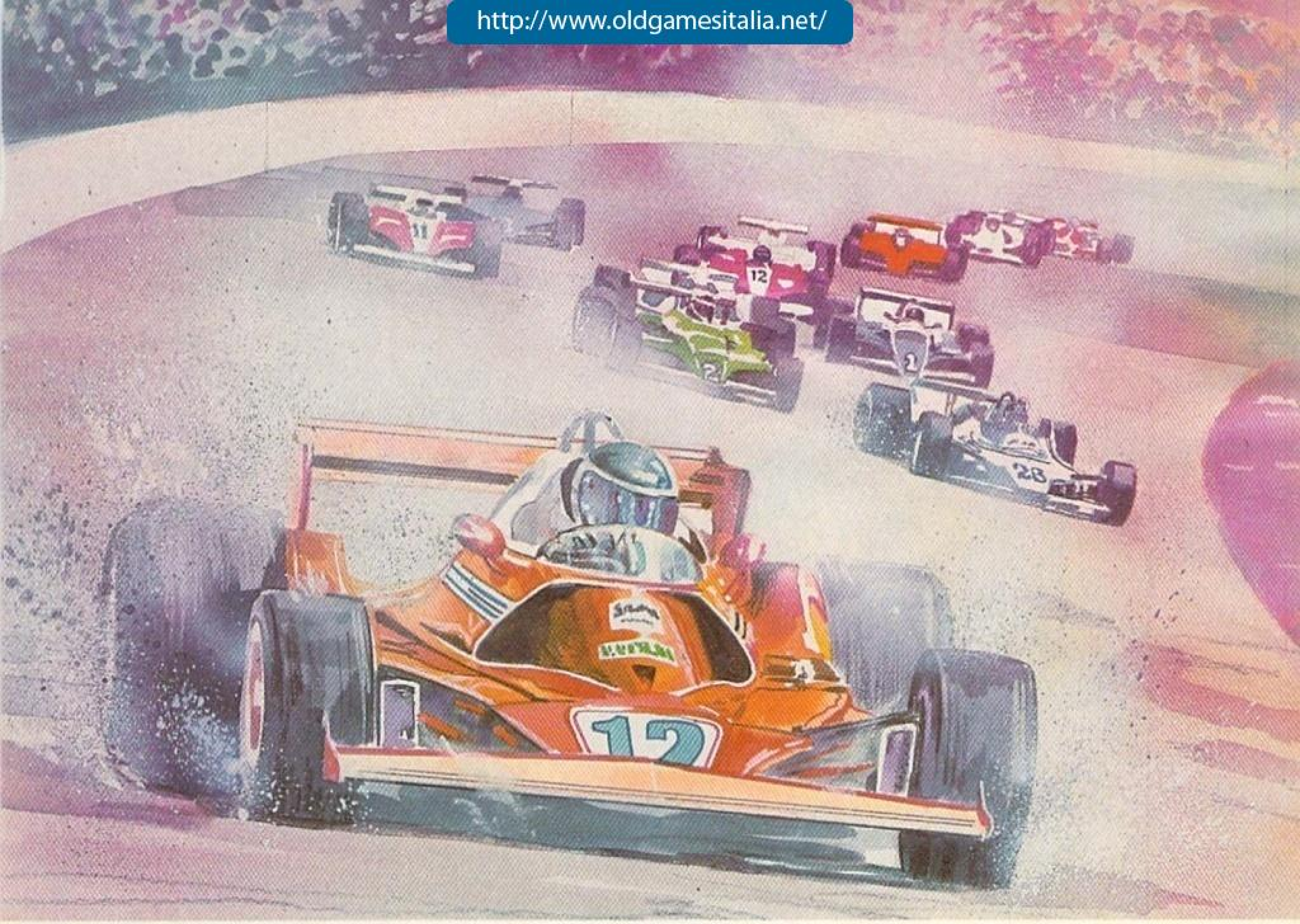
```
10 REM***  C64 RENUMBER ML LOADER
   ***'BAGD
20 POKE 53280,14:POKE 53281,6'CQUC
30 PRINT"[CLEAR]":PRINT"[DOWN3,RIGHT3]
   **RENUMBER YOUR C64 BASIC
   PROGRAM**"'CBQK
40 PRINT"[DOWN2,RIGHT4]
   BY CHUCK MOEHRINGER"'BAUG
50 PRINT"[DOWN3,RIGHT4]
   PLEASE WAIT WHILE LOADING
   DATA...."'BAWL
60 Z=0:FOR X=49408 TO 49523:READ Y
   :Z=Z+Y:POKE X,Y:NEXT X'JBBO
70 IF Z<>19626 THEN PRINT"DATA WRONG
   IN LINES 70 TO 130":END'GHUP
80 DATA 162,0,230,251,208,2,230,252,
   161,251,208,40'BRHM
85 DATA 24,165,251,105,2,133,253,
   144'BDBO
90 DATA 7,164,252,200,132,254,208,4,
   164,252,132'BOBN
95 DATA 254,161,253,208,3,134,253,
   96'BDQP
100 DATA 24,165,251,105,4,133,251,144,
    210,230,252'BPOD
105 DATA 208,206,201,137,240,10,
    201'BBQF
110 DATA 141,240,6,201,167,240,2,208,
    10,230,251'BNOD
115 DATA 208,2,230,252,232,134,253,
    96'BDHG
120 DATA 201,203,208,14,230,251,208,2,
    230,252,161'BPHF
125 DATA 251,201,164,240,230,208,
    242'BCXH
130 DATA 201,34,208,160,230,251,208,2,
    230,252,161'BPLG
135 DATA 251,201,34,240,148,201,0,
    240'BDMI
140 DATA 154,208,238'BLVB
150 Z=0:FOR X=49664 TO 49724:READ Y
    :Z=Z+Y:POKE X,Y:NEXT X'JBIM
160 IF Z<>10631 THEN PRINT"DATA WRONG
    IN LINES 160 TO 190":END'GHMN
170 DATA 162,0,164,251,200,132,253,
    208,7,164,252'BODJ
175 DATA 200,132,254,208,4,164,
    252'BAEM
180 DATA 132,254,161,253,208,27,230,
    253,208,2,230'BPXL
185 DATA 254,161,253,208,15,230,
    253'BBJN
190 DATA 208,2,230,254,161,253,208,5,
    169,0,129,251'BQDM
195 DATA 96,169,0,129,251,230,251,
    208'BDPO
200 DATA 201,230,252,208,197'BTVA
210 Z=0:FOR X=49920 TO 49990:READ Y
    :Z=Z+Y:POKE X,Y:NEXT X'JBIJ
220 IF Z<>11976 THEN PRINT"DATA WRONG
    IN LINES 220 TO 250":END'GHTK
```

```
230 DATA 162,0,161,251,72,230,251,208,
    2,230,252'BNUG
235 DATA 161,251,208,48,164,251,200,
    132'BFVK
240 DATA 253,208,7,164,252,200,132,
    254,208,4,164'BOGI
245 DATA 252,132,254,161,253,208,
    24'BBJK
250 DATA 230,253,208,2,230,254,161,
    253,208,14,104'BPSJ
255 DATA 129,251,169,0,230,253,208,
    2'BCGL
260 DATA 230,254,129,253,96,161,251,
    168,104,129,251,152,76,4,195'BFWN
270 Z=0:FOR X=50170 TO 50316:READ Y
    :Z=Z+Y:POKE X,Y:NEXT X'JBGP
280 IF Z<>22293 THEN PRINT"DATA WRONG
    IN LINES 280 TO 350":END'GHUQ
290 DATA 173,37,192,141,0,192,160,1,
    162,0,142,16,192'BSRN
295 DATA 169,192,133,254,169,16,
    133'BBAP
300 DATA 253,161,251,201,32,208,8,230,
    251,208,246'BPYF
305 DATA 230,252,208,242,161,251,
    201'BCXH
310 DATA 48,144,19,201,58,176,15,238,
    16,192,230'BNBF
315 DATA 253,129,253,230,251,208,
    235'BCMI
320 DATA 230,252,208,231,201,32,144,
    12,201,44,176'BPMH
325 DATA 8,230,251,208,219,230,
    252'BAIJ
330 DATA 208,215,201,0,240,12,201,58,
    240,8,201,44'BPEI
335 DATA 240,9,140,48,192,96,142,
    32'BBQK
340 DATA 192,240,3,140,32,192,173,16,
    192,205,0,192'BQXJ
345 DATA 240,7,142,48,192,140,64,
    192'BCOL
350 DATA 96,160,16,134,253,230,253,
    161,253,209,253'BQLK
355 DATA 208,12,206,0,192,208,243,
    142'BDAM
360 DATA 48,192,142,64,192,96,142,48,
    192,232,142,64,192,96'BYVN
370 Z=0:FOR X=50432 TO 50446:READ Y
    :Z=Z+Y:POKE X,Y:NEXT X'JBLQ
380 IF Z<>2748 THEN PRINT"DATA WRONG
    IN LINES 380 TO 390":END'GGFR
390 DATA 162,0,161,251,208,1,96,230,
    251,208,247,230,252,208,243'BEBQ
400 Z=0:FOR X=50688 TO 51068:READ Y
    :Z=Z+Y:POKE X,Y:NEXT X'JBAK
410 IF Z<>56300 THEN PRINT"DATA WRONG
    IN LINES 410 TO 600":END'GHJL
420 DATA 169,4,133,251,169,8,133,252,
    32,0,193,165'BPNI
425 DATA 253,208,1,96,165,251,133,
    178'BDUK
430 DATA 165,252,133,179,32,41,198,
    165,178,133,251'BQBJ
```

```
435 DATA 165,179,133,252,32,0,193,
    76'BCTL
440 DATA 11,198,32,250,195,165,251,
    141,113,192,165'BQMK
445 DATA 252,141,114,192,173,48,
    192'BBRM
450 DATA 240,22,173,114,192,133,179,
    173,113,192,133'BRGL
455 DATA 178,240,5,198,178,76,80,
    198'BCSN
460 DATA 198,178,198,179,96,173,64,
    192,208,84,173'BPMM
465 DATA 16,192,205,80,192,208,3,76,
    108'BFIP
470 DATA 198,144,6,32,221,198,76,108,
    198,32,54,199'BQPN
475 DATA 162,0,169,81,133,253,169,
    192'BDUP
480 DATA 133,254,56,161,253,233,15,
    129,178,206,16'BPQO
485 DATA 192,240,14,230,253,208,2,
    230'BDVQ
490 DATA 254,230,178,208,234,230,179,
    208,230,230'BOMP
495 DATA 178,208,2,230,179,161,178,
    201'BEKS
500 DATA 58,240,14,201,0,240,10,201,
    44,240,6,169,32'BRDH
505 DATA 129,178,208,230,173,113,
    192'BCSJ
510 DATA 133,178,173,114,192,133,179,
    165,178,240'BODI
515 DATA 5,198,178,76,193,198,198,
    178'BDCL
520 DATA 198,179,173,32,192,240,22,24,
    165,178,105'BPAJ
525 DATA 2,133,178,144,2,230,179,
    165'BCNL
530 DATA 178,133,251,165,179,133,252,
    76,41,198,96'BPOK
535 DATA 56,173,16,192,237,80,192,
    141'BDUM
540 DATA 115,192,173,115,192,208,7,
    173,80,192,141'BPPL
545 DATA 16,192,96,165,178,133,251,
    165'BEWO
550 DATA 179,133,252,32,0,194,206,115,
    192,173,113'BPHM
555 DATA 192,240,6,206,113,192,76,
    18'BCOO
560 DATA 199,206,113,192,206,114,192,
    165,179,205,97'BRFN
565 DATA 192,144,9,208,24,165,178,
    205'BDWP
570 DATA 96,192,176,17,173,96,192,240,
    6,206,96,192'BQPO
575 DATA 76,51,199,206,96,192,206,
    97'BCPQ
580 DATA 192,76,231,198,56,173,80,192,
    237,16,192'BOLP
585 DATA 141,115,192,173,115,192,208,
    7'BEFS
590 DATA 173,80,192,141,16,192,96,165,
    178,133,251'BPBQ
595 DATA 165,179,133,252,32,0,195,
    206'BDOS
600 DATA 115,192,238,113,192,208,3,
    238,114,192,165'BQPI
605 DATA 179,205,97,192,144,9,208,
    15'BCEK
610 DATA 165,178,205,96,192,176,8,238,
    96,192,208,3,238,97,192,76,64,
    199'BMLN
620 Z=0:FOR X=51200 TO 51321:READ Y
    :Z=Z+Y:POKE X,Y:NEXT X'JBYO
630 IF Z<>19347 THEN PRINT"DATA WRONG
    IN LINES 630 TO 690":END'GHHP
640 DATA 169,4,133,251,169,8,133,252,
    32,0,193,165'BPNM
645 DATA 253,208,1,96,165,251,133,
    253'BDOO
650 DATA 165,252,133,254,32,33,200,32,
    0,193,76,11'BPSN
655 DATA 200,162,0,161,253,201,32,
    208'BDNP
660 DATA 8,230,253,208,246,230,254,
    208,242,161,253'BQHO
665 DATA 201,33,144,17,201,43,176,
    13'BCWQ
670 DATA 24,105,15,129,253,230,253,
    208,237,230,254'BQDP
675 DATA 208,233,201,0,240,4,201,
    58'BBRR
680 DATA 208,17,165,253,208,2,198,254,
    198,253,165'BPIQ
685 DATA 253,133,251,165,254,133,
    252'BCLS
690 DATA 96,201,44,240,12,201,32,240,
    8,201,48,144'BPOR
695 DATA 227,201,58,176,223,230,
    253'BBMT
700 DATA 208,188,230,254,208,184,
    207'BCWG
710 Z=0:FOR X=51456 TO 51522:READ Y
    :Z=Z+Y:POKE X,Y:NEXT X'JBOO
720 IF Z<>11606 THEN PRINT"DATA WRONG
    IN LINES 720 TO 750":END'GHTP
730 DATA 169,1,133,251,133,253,169,8,
    133,252,133'BOLM
735 DATA 254,162,0,160,1,177,251,
    208'BCEO
740 DATA 1,96,24,165,251,105,4,133,
    251,144,2,230'BOYM
745 DATA 252,230,251,208,2,230,252,
    161'BEPQ
750 DATA 251,208,246,230,251,208,2,
    230,252,165,252'BQAO
755 DATA 145,253,165,251,129,253,
    165'BCVQ
760 DATA 251,133,253,165,252,133,254,
    208,206,255'BONP
770 PRINT"[CLEAR]":PRINT"[BLUE,DOWN]
    POKE44,150:POKE38400,0:NEW"'CBNQ
780 PRINT"[DOWN2]LOAD ";CHR$(34);
    "RENUMBER-BASIC";CHR$(34);",
    8"'DMAT
790 PRINT"[DOWN4]RUN"'BAML
800 POKE 631,13:POKE 632,13
    :POKE 633,13:POKE 198,3'EBOJ
810 PRINT"[HOME]";:END'CCKE
```

Listing 2. BASIC Renumber

```
10 PRINT"[CLEAR,DOWN3,RIGHT3,L. BLUE]
   **RENUMBER BASIC PROGRAM**"'BASG
20 PRINT"[DOWN,RIGHT3]BY CHUCK
   MOEHRINGER"'BAYE
30 X=X+1:IF X=2 THEN 80'FIBE
40 PRINT"[DOWN,RIGHT3]PROGRAM TO BE
   RENUMBERED":INPUT"[RIGHT3]";A$'CELJ
50 PRINT"[DOWN,RIGHT3]INSERT DISK
   WITH ";A$:PRINT"[DOWN,RIGHT3]
   HIT 'RETURN' WHEN READY"'CEEO
60 GET X$:IF X$<>CHR$(13)THEN 60'GLYI
70 LOAD A$,8,1'BGJE
80 Y=2048:INPUT"[DOWN2,RIGHT3]
   FIRST LINE NUMBER";Y2'CJIM
90 IF Y2<0 OR Y2<>INT(Y2)THEN 80'HLFM
100 INPUT"[DOWN,RIGHT3]INCREMENT";
    Y3'BDWY
110 IF Y3<1 OR Y3<>INT(Y3)THEN
    100'HMAD
120 A=49151:B=49231:C=49189:D=256
    :E=49249:F=49248'GOWJ
125 G=251:H=252:I=50688:J=50432'EXJJ
130 PRINT"[DOWN] NEW LINE #[SPACE3]
    OLD LINE #"'BAYE
140 IF PEEK(Y+2)<>0 THEN 200'GIJE
150 SYS 51200:SYS 51456:POKE 44,8'DQQF
160 POKE 251,Y+3-256*INT((Y+3)/256)
    :POKE 46,INT((Y+3)/256)
    :POKE 45,PEEK(251)'NPUR
170 POKE 48,PEEK(46):POKE 50,PEEK(46)
    :POKE 175,PEEK(46):POKE 47,
    PEEK(45)'IHIN
180 POKE 49,PEEK(45):POKE 174,
    PEEK(45)'EQRI
190 PRINT"[DOWN,RIGHT]YOU CAN NOW
    LIST, RUN, OR SAVE YOUR[SPACE5]
    RENUMBERED[SPACE2]PROGRAM"'BAGU
195 END'BACJ
200 PRINT Y2;:K=Y+3:L=K+1
    :A3=PEEK(K)+D*PEEK(L)
    :PRINT TAB(16)A3'MCPK
210 POKE L,INT(Y2/D):POKE K,
    Y2-D*PEEK(L):Y=Y+5'JUSH
220 C$=STR$(A3):D$=STR$(Y2)
    :POKE C,LEN(C$)-1:POKE B+1,
    LEN(D$)-1'LFIL
230 FOR X=2 TO LEN(C$):POKE A+X,
    ASC(MID$(C$,X,1)):NEXT'JVGJ
240 FOR X=2 TO LEN(D$):POKE B+X,
    ASC(MID$(D$,X,1)):NEXT'JVJK
250 POKE E,INT(Y/D):POKE F,Y-D*PEEK(E)
    :SYS I:Y=PEEK(F)+D*PEEK(E)'NABP
260 POKE H,INT(Y/D):POKE G,Y-D*PEEK(H)
    :SYS J:Y=PEEK(G)+D*PEEK(H)
    :Y2=Y2+Y3'PHTT
270 IF PEEK(Y+2)<>0 THEN 200'GIJI
280 GOTO 150'BDFF
```



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DIAMOND APPRAISALS

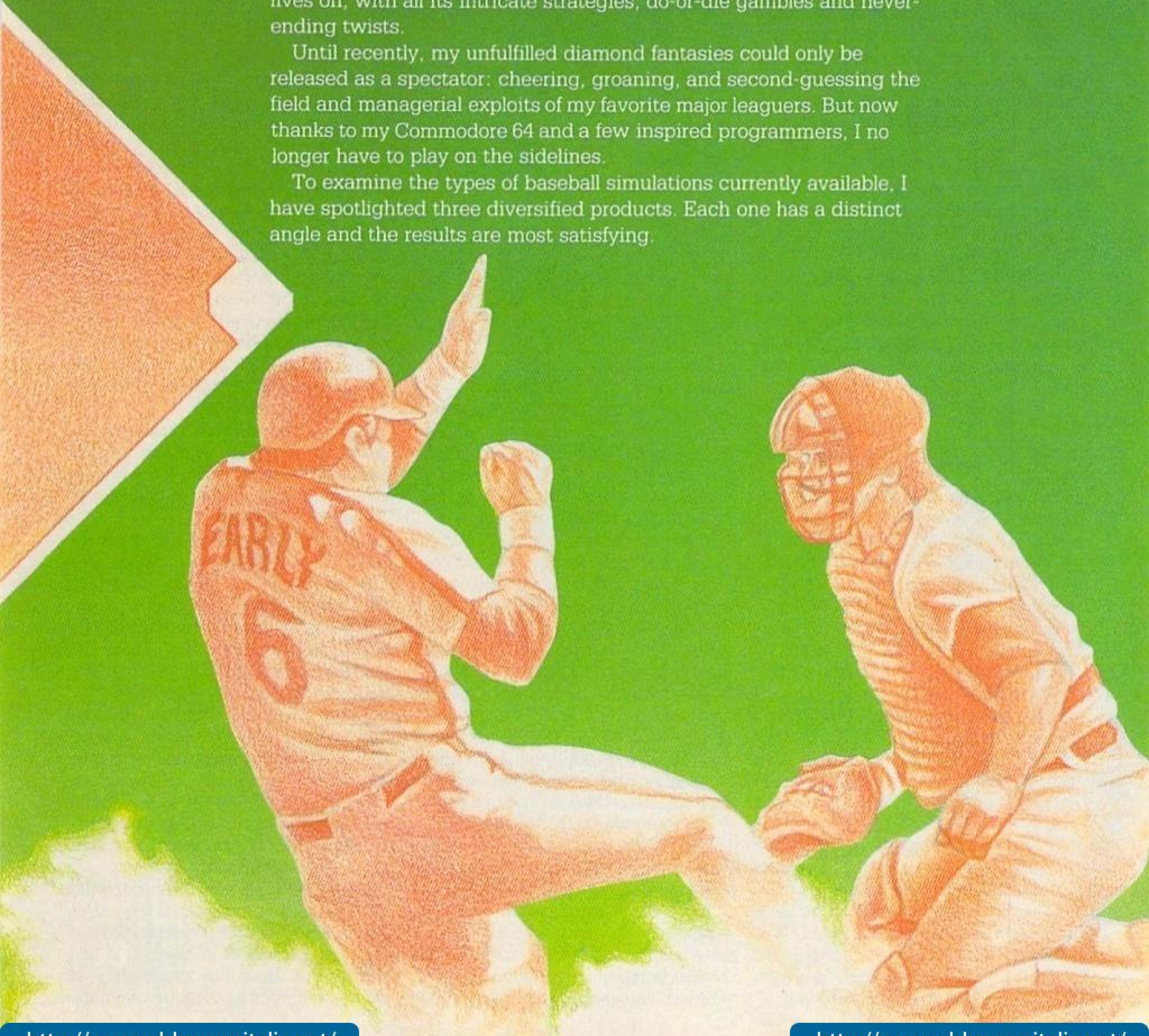
BY MARK COTONE

I used to play baseball—until one day a hard smoking fastball hit me squarely between my ribs and hips. Lying on the ground, trying to relocate my escaped air, I thought it over. Maybe another sport would suit me better. Bowling, golf, softball. Yeah, I liked the sound of that: *soft*ball.

So, in my early teens, I hung up my cleats. But my love for the game lives on, with all its intricate strategies, do-or-die gambles and never-ending twists.

Until recently, my unfulfilled diamond fantasies could only be released as a spectator: cheering, groaning, and second-guessing the field and managerial exploits of my favorite major leaguers. But now thanks to my Commodore 64 and a few inspired programmers, I no longer have to play on the sidelines.

To examine the types of baseball simulations currently available, I have spotlighted three diversified products. Each one has a distinct angle and the results are most satisfying.



DIAMOND APPRAISALS

Computer Baseball

Quality Head Game

Strategic Simulations' *Computer Baseball* is for any fan who has ever been meticulous enough to keep a full score card or any devotee who finds himself habitually leafing through the sports to study the box scores, standing and player percentages.

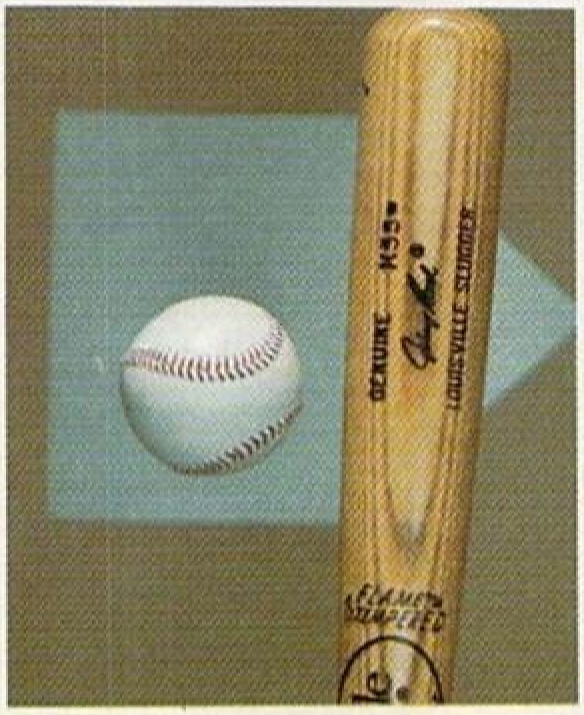
Using a statistical replay format, *Computer Baseball* allows you to become a full-scale manager. Against a human opponent or computer, you can lead some of baseball's legendary squads to battle in some of history's greatest match-ups. Represented are 28 World Series teams from every era. However you envision your dream club, there's sure to be a roster with all the correct ingredients. From the 1906 Chicago White Sox to the 1980 Philadelphia Phillies, each player's speed, power and finesse has been accounted for through staggering records. Each batter is rated and classed by a tabulation of games played, at bats, hits, doubles, triples, homeruns, runs, stance, walks, strikeouts, stolen bases and fielding.

Pitchers are rated by an equally intricate process, accounting all factors which might enhance or hamper performance. This includes how long it's been since his last outing and a resulting fatigue factor.

But don't be fooled. This game isn't all formulas. Only tested strategic theory, aided by a little luck, will produce a consistent winner. The actual pivotal point for each play is the keyboard manager's tactical decisions. Where should the outfielders be positioned? How should the pitcher approach this hitter? Should the infield protect the lines, hold the runners, or move in at double-play depth? Will the batter sacrifice, swing for the fences or gamble with the hit and run?

With your Commodore doing the bookkeeping, the game is fast-paced. The screen displays batting orders, averages and pitchers alongside a representation of the field. After the offensive and defensive options are set, the stored information is sifted, and the resulting action portrayed.

Whether you prefer strategy or action, there's a Commodore 64 baseball game for you.



The expansive computer memory also allows the ball game to inch closer to realism: relief pitchers must be warmed in the bullpen before taking the mound; swift batters can beat out an infield single; and pitchers can become unsettled, requiring a mid-inning visit to talk things over.

These intricacies add a colorful dimension to the program without bogging down the action. An entire nine-inning affair shouldn't take more than an hour, with precise instruction that will have any baseball veteran booted up and playing in minutes.

For any fanatics, rookies or spectators who are interested, there is also some enclosed paraphernalia detailing teams, explaining basic coaching strategies and giving step-by-step instructions on how to create and program your own team—even if it's just the neighborhood pick-up squad. Also, current American and National League registers are available.

If you think you have the stuff that makes the boys of summer shine, here's your test. This simulation was well researched, documented and designed. The graphics may not bowl you over, but this game is played in your mind not on the screen. And as cerebral sports conflicts come, this one is hard to beat.

Okay, you say, all well and good. Nothing like a little spring training for the grey matter beneath the batting helmets. But baseball is both mental *and* physical. How about a little joystick reflex action?

Star League Baseball

Resurfacing the Field

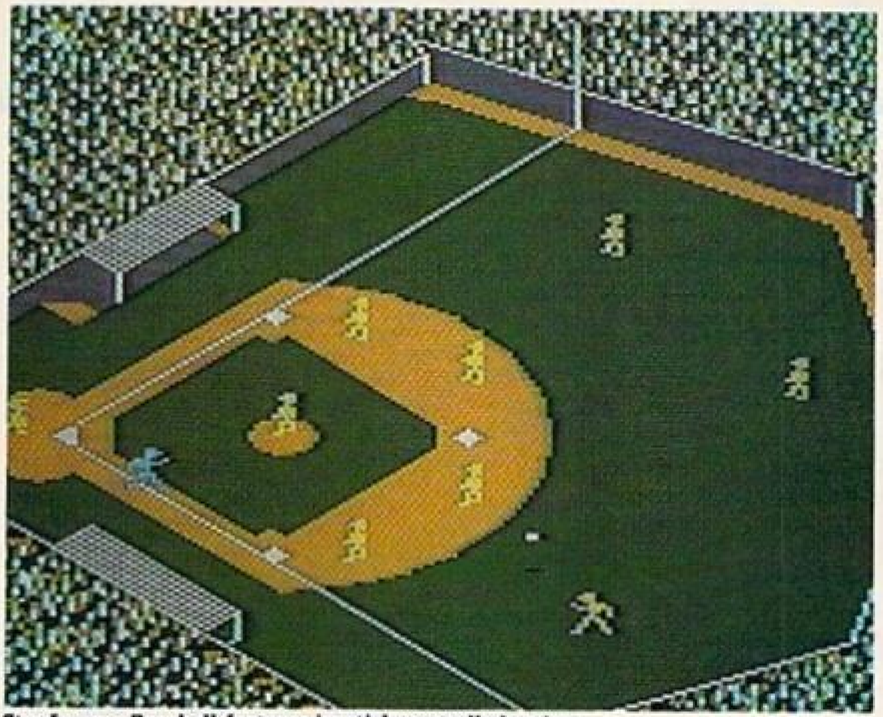
If one were to trace the progression of arcade-style video baseball through its short history, a disquieting observation can be made. From the most advanced coin-op to the simplest computer, the vast majority of baseball programs look and play the same. The typical contest has a perspective looking from above homeplate, providing a bird's-eye view of the field below, with the batter positioned in the lower portion of the screen. The challenge is then to coordinate joystick moves to either make contact with a pitch or defensively activate a teammate to intercept the batted pellet. Other than that, they all look and play pretty much alike.

Gamestar's version, however, is different. In fact, with a few healthy cracks at creative design, they have entirely revamped the complexion of arcade-style baseball.

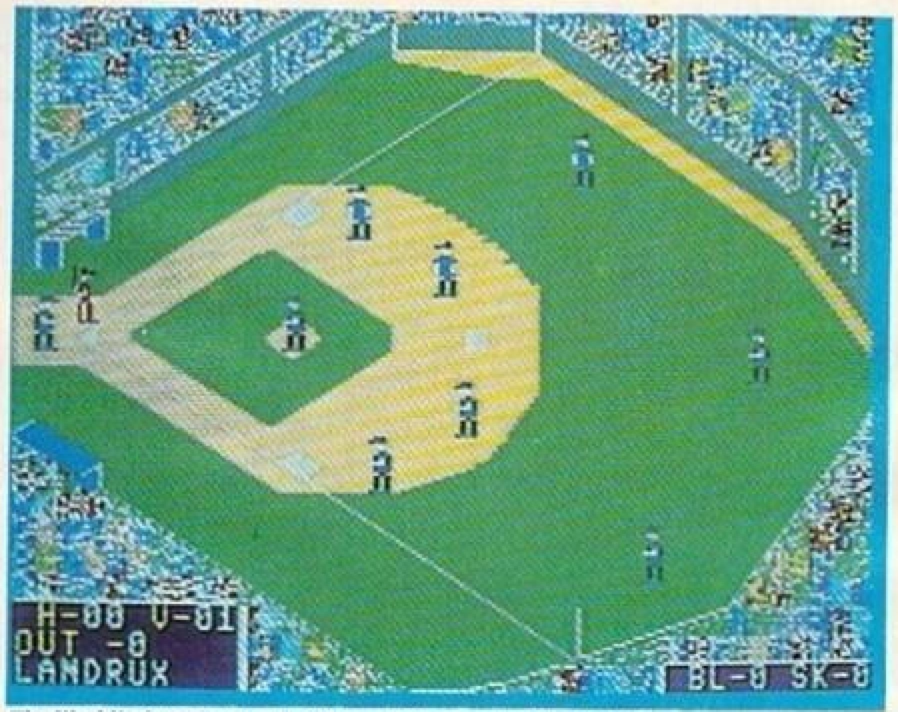
The most obvious new slant comes in the area of player perspective. Our new seats are up in the right-field bleachers, giving a view that is undoubtedly the best in the house. The entire packed stadium unfolds before you with thousands of screaming fans outlining the 3-D diamond below.

The pitcher now takes his wind-up from center screen, tossing toward the homeplate uncharacteristically placed on the far left. This position twist gave the programmers the ability to append the ball with an accompanying shadow, paramount in securing a realistic third dimension.

The hurled ball now dances toward the plate, dipping and sailing in a convincing fashion. Batters who are deft enough can drive the ball in any number of directions depending on the type of pitch and the timing of the



Star League Baseball features joystick-controlled action.



The World's Greatest Baseball Game lets you play the statistics.

swing. Deep line drives, infield popups and hard-bouncing smashes are all possible, giving *Star League* a depth not found in its action ancestors. For instance, catching a flyout is no longer just a matter of placing a fielder in the path of a ball. Now, the trajectory and shadow must also be equated.

The second innovation takes place after the ball is hit. The correct onscreen character is automatically activated to make the play—without any joystick input. But, although the subsequent catch and throw do require accurate controller manipulations, your Gamestar team will make the initial call for the ball. This tends to alleviate the frustration that sometimes arises when one contestant, unfamiliar with the game, unsuccessfully jerks the joystick about, frantically trying to awaken his fielders, while his smiling opponent quickly rounds the bases.

Here, less is left to chance, with the emphasis placed on skill, strategy and action. Pick-off's, steals, bunts, leading and double plays are all available through basic, easy-to-learn controller movements.

Some additional options and frills further demonstrate the creativity of the programming team. A spirited organist, precise scoreboard operator, cheering crowd and opening national anthem will keep you intensely involved. Top this off with such previously unheard of electives as hitting styles (liners or sluggers), pitching styles (fast ball, curve or knuckle reliever), style game (full nine inning or batting practice) with choice of adversary (human or computer), and you'll agree that *Star League Baseball* is nothing short of Major League.

> *Until recently, my unfulfilled diamond fantasies could only be released as a spectator. But now, thanks to my Commodore 64 and a few inspired programmers, I no longer have to play on the sidelines.*

The World's Greatest Baseball Game

A Stand-Up Double

After examining the first two products in this article, it would appear that hobbyists in the market for a baseball simulation are restricted to one of two choices: they can either bank on an action program or purchase one that is strictly strategy. To enjoy one particular gaming method, the other has to be sacrificed.

At least that's how it was before Epyx came along. Now, with the introduction of *The World's Greatest Baseball Game*, we have a contest that brings them together.

First and foremost, you have to credit Epyx on their willingness to gamble with this unprecedented style. A compromise of this sort, which tries to satiate the appetite of two distinct groups, always runs the risk of alienating itself from both. People looking for hot or cold are rarely satisfied with warm. But in designing their contest, Epyx has made a valiant attempt to gratify all involved by borrowing the very features that have made both "action" and "strategy" baseball games successful.

Aside from the fact that the fielders must be activated with the appropriate joystick nudge, Gamestar's *Star League Baseball* and Epyx's *The World's Greatest Baseball Game* both look and play the same. The onscreen stadium, as well as point of view, are right out of the play book. And why not? We have already discussed the advantages of this set-up, and this is simply a testament to our conclusion. For realism, this vantage point is second to none.

The other side of the coin, the statistical backdrop, is equally impressive. As manager, your pickings are anything but slim. There is a choice of 25 Major League ball clubs, including recent World Series winners, All Star teams, some classic squads from yesteryear, as well as a group of rookies. Each club has a full roster from which you can select your starting lineup, with every player analyzed in a fashion similar to that in SSI's *Computer Baseball*.

Batters are rated by average and speed; pitchers by ERA, effectiveness and perseverance; and fielders on quickness and fielding ability.

If the entire affair seems a bit confusing at first, don't be alarmed. I was also initially perplexed by this concept. (Exactly what was my role and influence as Pete Rose headed for third?) But it all comes together rather

Continued on pg. 126

THE ROAR OF THE GREASE AND THE SMELL OF THE CROWD

BY JIM GRACELY

As my great second aunt has always said, auto racing is like eggs: everyone wants theirs different. Well, software companies seem to agree. Most of the variations include changing perspectives: above the racetrack, behind the driver or in the driver's seat, and extras such as construction sets and pitstops.

Before I discuss the games themselves, let's think about auto racing as a computer game. What are the skills and techniques needed to be a successful racer? Well, part of that depends on the particular kind of racing you are interested in. Stock car racing requires different mechanical abilities than slot car racing and the grand prix circuit requires different driving abilities than an oval track.

But what are the similar skills? Obviously, the one thing all racing has in common is speed. Most people are used to driving at a maximum of 55 mph (well, maybe 60, when nobody is looking). However when you enter the world of auto racing, 50 mph is just barely moving. Another similarity is quick thinking. Whether trying to guess the number of laps your fuel will last or the highest speed you can take the next corner at, things just happen faster at 200 mph and your thinking has to speed up likewise.

High speeds require a light touch on the wheel (in this case, the joystick). Unnecessary motion leads to spinouts and crashes. All of the auto racing games I looked at had this in common. If you can't sit still for five minutes with your concentration on your fingertips, then auto racing may not be for you.

> *Whether you just want to go for a Sunday lap around the track or feel like tackling the circuit with a robot driver, there's probably an auto racing game on the market for you.*

Rally Speedway

Commodore's *Rally Speedway* is a fun, bird's eye-view, two-player racing game. The object of the game is simply to finish a race course with the fastest time. It allows both players to race simultaneously and has a time penalty system to keep the two racers close. The graphics are nice and the complete screen scrolling is quite impressive. The added touches to this game are the optional variations in play, the choice of six different race courses and a construction set to allow the creation of your own courses.

The game begins with an options screen that allows you to choose your race variations. Some of the choices include one or two players, dry, wet or icy roads, one of five top speeds for the cars (40-200 mph) and three rates of acceleration. You can also select one of the six tracks included, build your own or load in a track you previously saved. Another option which assists in learning the ropes of the game is an "only in a computer" mode. When racing with this option, you are indestructible. Trees nor houses nor pools can destroy you. This is the place to start (or return to whenever you have an urge to do some field romping).

On to the races! Once the race has started, the clocks for each player begin ticking. Bumping is definitely allowed. In fact, I consider it to be one of the most fun aspects of the game (I always did like bumper cars). The race continues with the two cars battling for the lead. If one player gets one full screen in front of the other, a five-second penalty is imposed on the slower car and the race continues. If one player crashes, a ten-second time penalty is given and the race continues. Both players cross the finish line, but the first one isn't necessarily the winner; it's the best time that wins.

The game is full of other fun features like the squealing of the tires going around a corner, tailspins and spinouts on the corners (if you're going too fast) and, of course, the crashes. When (if?) you crash, there

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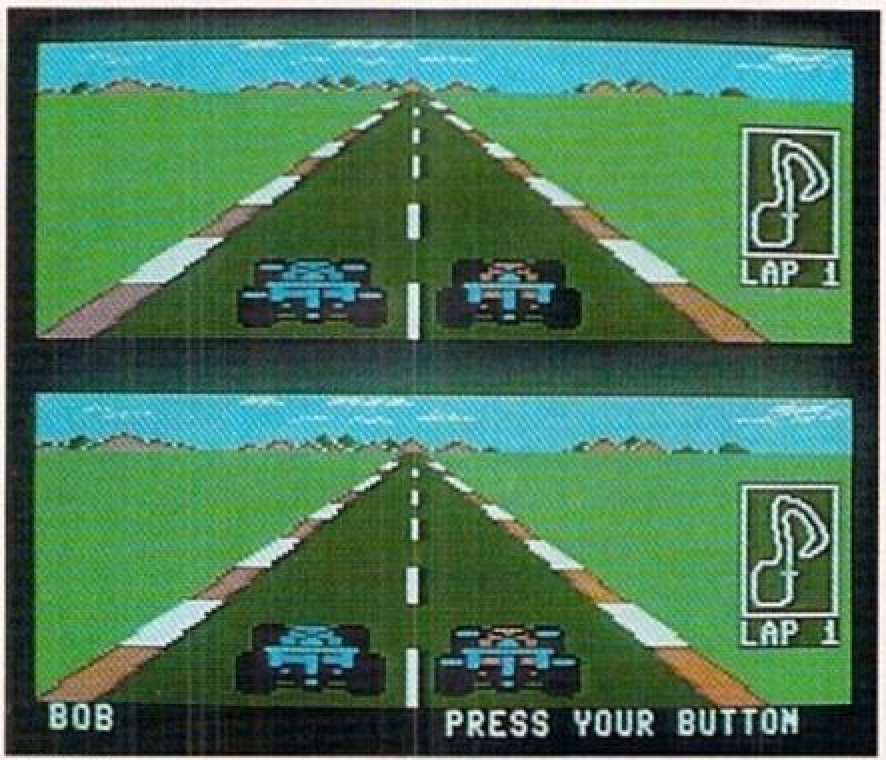
If you can't sit still for five minutes with your concentration on your fingertips, then auto racing may not be for you.



Pitstop II

are two possible consequences which are just too funny to give away here. The construction set is another feature which adds to this game and extends its enjoyment.

Like to race? Better yet, do you have a friend you like to race against? Then this is a good game for you.

Hints for *Rally Speedway*

1) Remember that you are always speeding up unless you are braking. Use the brake (firebutton) to keep yourself at a comfortable speed.

2) Watch for patterns of houses, bridges and pools along the track to keep your bearings and alert you as to when the next corner is coming.

3) Because of the way the screen scrolls, the leader can be all the way on the leading edge of the screen. This gives the trailing player an advantage because he sees what is ahead by watching the leader. If someone wants to always be in the lead, let them. It's the time that counts, not who gets there first!

Pitstop II

Pitstop II is a two-player variation of Epyx's *Pitstop*. While *Pitstop* was an enjoyable racing game, the change to allow two players to race simultaneously is what really makes this game great. This is an all-out race-to-the-finish kind of game.

The perspective is from directly behind your car. The screen is split with one racer on the top and one on the bottom. Each player has his own view of the race. If the two cars are near each other, the trailing player can see the other on his screen. The graphics are nicely done and the sound effects really add to the game. The finishing touches are the choice of six different race courses (or a grand circuit of all six) and real-life conditions such as tire wear and fuel consumption.

This game also begins with an options screen that allows you to choose your race variations. The options include one or two players, your choice of courses and the number of laps, and three difficulty levels (rookie, semi-pro and pro). The three levels of play determine the speed at which your tires wear out and your fuel is consumed (which increases the number of pitstops necessary).

And the race begins! In this game, if you don't have a friend to play against, you aren't alone. The computer provides the Epyx Robodriver as player two in one-player games, and the track is filled with eight other drivers regardless. The clock begins counting the seconds as the cars fly off the starting line.

In this game, the rules are a little different. If you bump the car in front of you, your speed is automatically reduced to the speed of the other car. Most other cars seem to move at about 130-150 mph. If you bump the siderails, your speed decreases as if you were braking hard. Whenever you bump anything, you increase the wear on your tires. They progress from black to blue, purple, green, cyan, red, yellow and white. When they become white you crash, disqualifying yourself from the race.

If you just want to cruise around the track, select a three-lap race. I could get through three laps of any course without running out of fuel or destroying my tires. To play this game to its fullest, you should choose either the six-lap or nine-lap race. This is where the real strategy of *Pitstop II* comes into play. Should you chance one more lap on your tires to get ahead or make a pitstop now and catch him the next time around? Now all-out racing takes a backseat to quick thinking and logical deduction.

In all, this is a great game for two players. The added touches like the speedometer, the radar map of the course and your position, and the pitstops make it an enjoyable game.

Hints for *Pitstop II*

1) Remember that bumping the car in front decreases your speed faster than bumping the railing. If it's one or the other, hit the railing.

2) Forget the use of the firebutton for turbo boost and keep one finger on the firebutton at all times. This lets you brake and accelerate more quickly.

3) Because of the above, be sure to use a comfortable joystick with a soft-touch firebutton. The action of the joystick should also be a little sluggish to keep you from oversteering. The Prostick II would be a good choice.

4) If you can't get your car to leave the pits, check the pitcrew. All men must be behind the white line before the car can leave.

5) The Epyx Robodriver has a maximum speed of about 240 mph; yours is 251. You can beat the Robodriver by keeping a nice steady pace and blowing it away in the straights.

6) The only feature I would have liked would be an average speed for the race. This way you could watch your skill increase. To calculate your average speed, look at the back of the instruction pamphlet for the length of the course you are on. This will be called length. The number of laps of the race will be laps and the time you completed it in will be called time. Use the following formula to calculate your average speed:

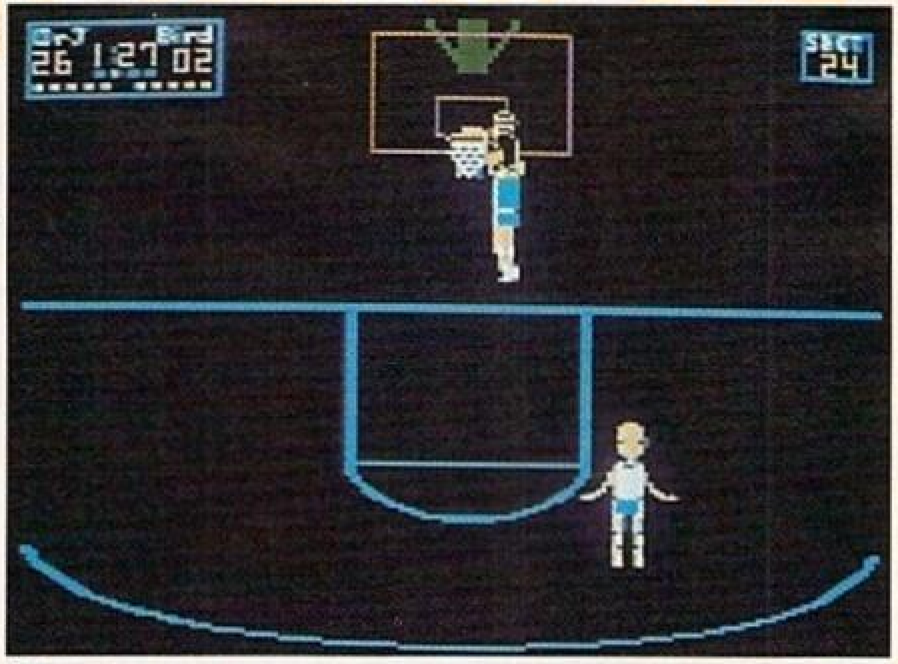
$$\text{Average} = \frac{(\text{Length} * \text{Laps} * 60)}{\text{Time}}$$

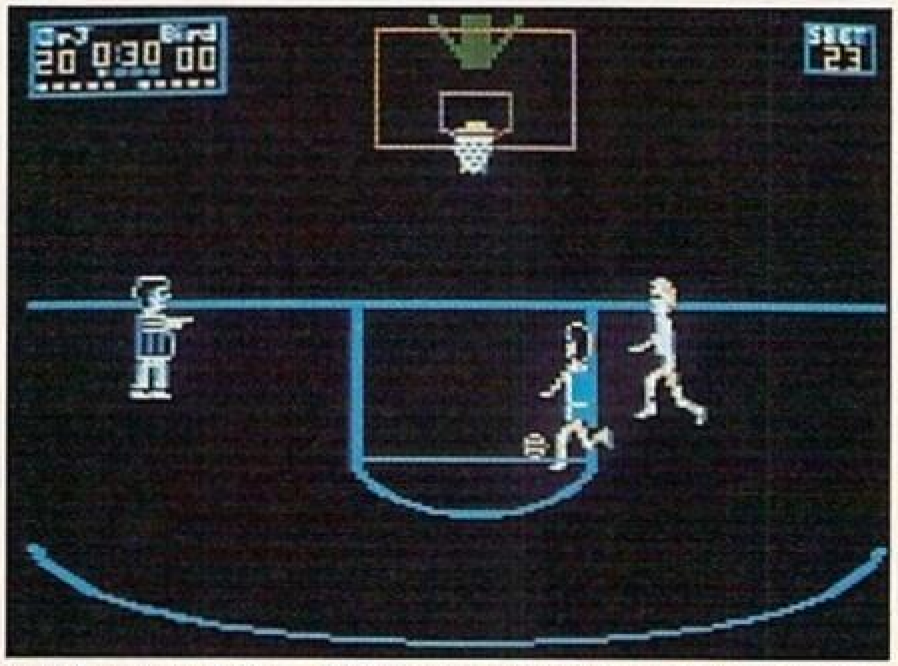
Rally Speedway
Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380

Pitstop II
Epyx
1043 Kiel Court
Sunnyvale, CA 94089

JULIUS ERVING AND LARRY BIRD GO ONE-ON-ONE

REVIEWED BY KEVIN DEWEY





You are facing one of the best players in basketball. It's you against him. You begin dribbling up the court, pivot left, run right. Your opponent is fooled for a moment and you slip by him, making a 360-degree slam dunk. The backboard shatters, the crowd roars in approval and the buzzer sounds. You've just beaten Dr. J. in one-on-one!

The videogame *Julius Erving and Larry Bird Go One-on-One* for the 64 is a remarkable accomplishment in computer sports games. Its graphics are amazingly detailed and the sound effects are very realistic.

In *One-on-One* you are faced with the task of beating Larry Bird, Julius Erving or a friend. If you are playing against the computer, you control one of the two superstars and the computer controls the other. If you are playing a friend, you each take one.

Controlling your man is easy. He automatically dribbles the ball and you need on'y press the fire button to leap into the air and release it to shoot the ball. Tapping the button quickly pivots your man, and, when you are on defense, attempts a steal. Make him slam dunk, rebound, stuff shots and volley for position under the net.

The rules are the same as a usual basketball game. There are four quarters, penalties, a shot clock, free throws, three-point shots, time outs, shattering backboards, annoying referees and instant replays. *One-on-One* is authentic, to say the least.

The graphics are superb. The players are extremely detailed, with every little twist of the body, move of the hands, and shift of the feet depicted.

The court itself is only lines, but who says that isn't what a court of light looks like? The net looks like a normal net and swishes when a shot goes in. The referee and the guy who cleans up shattered backboards are also done well.

The swoosh of a good shot, the referee's whistle, the ball bouncing, the shattering backboard, the angry words of the man who cleans it up and the buzzers all use the 64's full sound capabilities. However, the sound of the ball being bounced against the court does become a bit monotonous and I sometimes wished I could hear the squeak of sneakers.

> ***The actual game play is far superior to most of the other videogames I've played, mostly as a result of the amazing control you have over your character.***

The actual game play is far superior to most of the other videogames I've played, mostly as a result of the amazing control you have over your character. During the course of the game, you also make many strategy decisions. For example, as the game progresses, your man becomes tired and you must decide whether to take time out, allowing him to rest up and play better, or save him for later in the game. There are also other strategy decisions, like whether to take the chance of missing a three-pointer to win the game or to take a more sure shot and be content with a tie. So *One-on-One* is not only a game involving fast reflexes, but a game for thinkers too.

This game has many options: four skill levels, variable lengths for quarters, and the option to play up to a certain score. These options are very important, because without them, interest in the game could wane rather easily. It also has a pause key, the option to play in slow motion and a reset key.

Overall, *One-on-One* is a very enjoyable gaming experience, with excellent graphics, sound and game play. It is one of the best sports games I've seen.

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San Mateo, CA 94403

http://www.oldgamesitalia.net/ http://www.oldgamesitalia.net/

FOOTBALL FOR THE CONNOISSEUR

BY LENNY NELSON

The Baltimore Colts are now in Indianapolis, the Raiders are in Los Angeles and the New Orleans Saints are looking to move to Jacksonville. The Philadelphia Stars are in Baltimore, the Outlaws are now the Renegades and the Boston Breakers, or is it the New Orleans Breakers, or is it Portland...?

Let's forget all the confusing stuff and play some real football, computer style. We'll look at three football simulations available for the Commodore 64: *Computer Quarterback* by Strategic Simulations, *Computer Football Strategy* by Microcomputer Games and *On-Field Football* by Gamestar.

The three software packages differ in points of view. *Computer Quarterback* and *Computer Football Strategy* are second-person simulations, meaning that players take the position of owner/coach and call the play, then sit back and wait for the result. *On-Field Football* is a first-person game, meaning that the players take the position of player/coach and not only call the play, but control the on-field movement via joystick.

Computer Football Strategy

Computer Football Strategy is a one- or two-player simulation that allows you to either play another player or take on the computer. After loading, the computer prompts you for player options. If you specify the computer as an opponent, the computer becomes the "Visitor" and you pick a name for your team.

When the program is ready, the top half of the screen contains a horizontal 100-yard field, team names, a 15-minute clock, quarter marker, time outs left and scoring by quarter. On the field is the ball, two blue-shirted offensive men and two black-shirted defensive men. The bottom half of the screen shows the ten defensive plays and the 22 offensive plays available. Each player enters a play (the computer will enter its play if you are in the one-player mode) and the action begins.

> *Whether you want on-line action down on the field or a realistic strategy game, there's a Commodore 64 football game for you.*

The bottom half of the screen will show the offensive play, defensive play, result, down and time used during the play. Penalties, fumbles, timeouts, they're all here. The game progresses as fast or slow as you wish.

One great feature of this simulation is the statistics screen. At the half and game end, a screen appears showing each team's statistics, including the total score by quarter, number of runs, passes and penalties with their associated yards, pass completions and percentage, punts/average and turnovers.

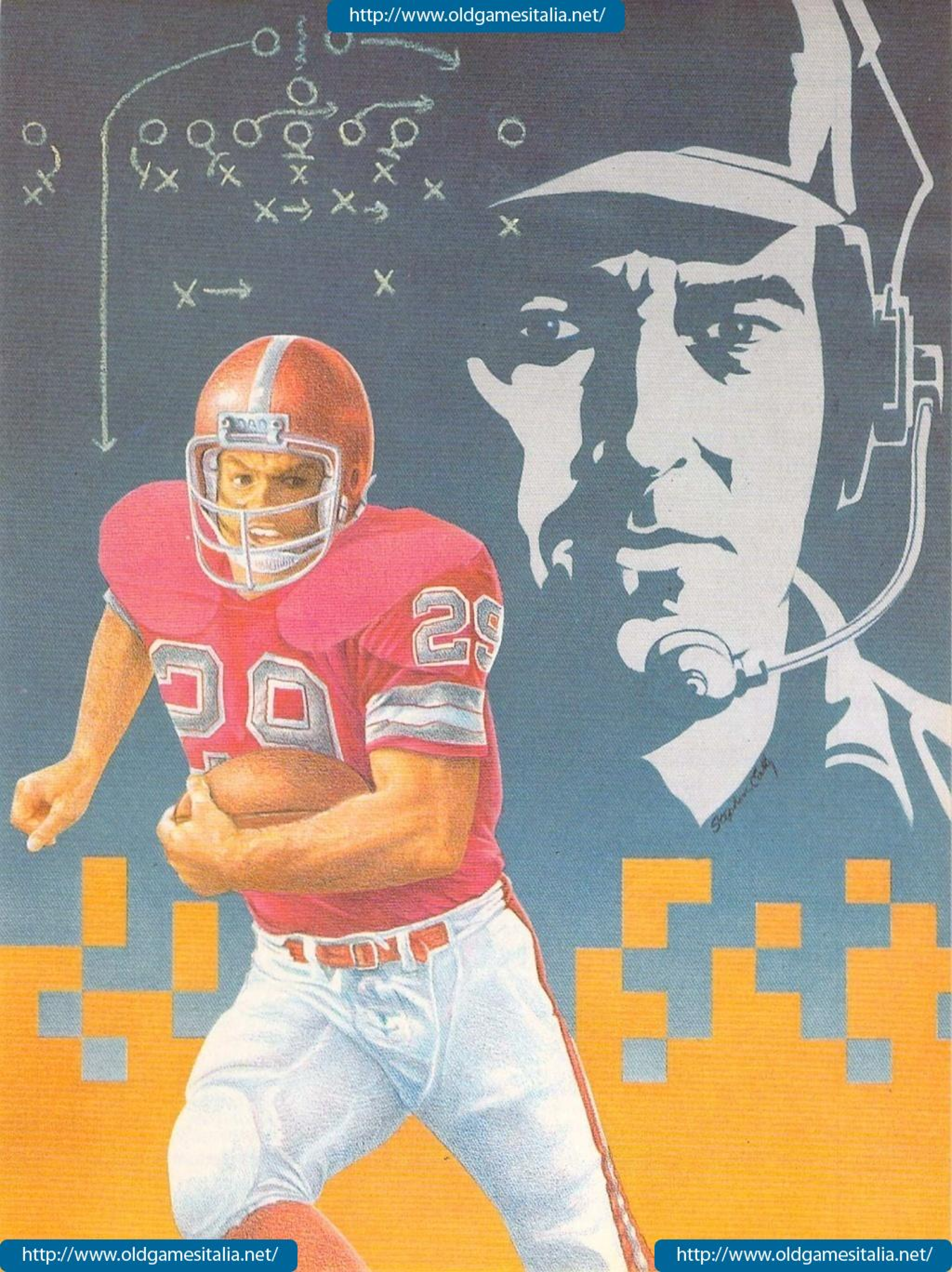
There are a few minor problems: the computer can be beat 90% of the time and during a two-player game, you must remember to keep the offensive player from peeking at the keyboard while the defense is choosing a play. Also, there is no probability involved. Play A against defense B will always yield result C. This is a constant and there is a chart included showing a result of each matchup. Even so, there are enough plays to make up for it.

Computer Quarterback

You'll notice a difference as soon as you load this one: it's a remarkable simulation. You can choose to play semi-pro or pro, one or two players and choose a computer team via SSI NFL data disks or build your own.

For example, let's build the "Chiefs." Specify a certain amount of money, say $3,000 and the player screen appears. At this time, 12 player positions such as quarterback, defensive back, full-back and kicker come up. Next to each position is a minimum, average and maximum price which corresponds to 70%, 100% or 130% player ability. You can mix and match until you run out of money. Once your team or teams are built, you go back to the main menu and load the appropriate version (one- or two-player). Once the game is loaded, you must name the teams and assign the plays. There are 36 offensive and 31 defensive plays, none of which are numbered. You can have the computer randomly number them, sequentially number them, or you can number each play yourself (each player may choose any option) and then print this play chart. At this point you specify the quarter length of five to 15 minutes and between-play delay of five to 30 seconds. (In a real game, this is the time it takes for the players to walk back to the huddle.)

Now comes the great feature: the game film. If specified, each play as it is run will print on the printer and will include down, yards to go for first down, yard line, time, offensive play, defensive play and the result. After several games, you can see any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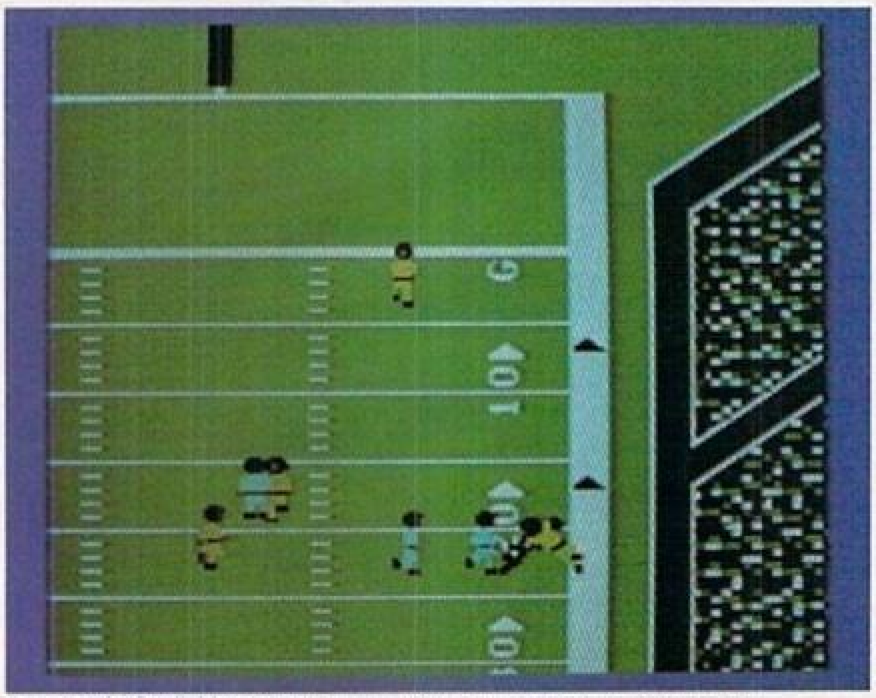
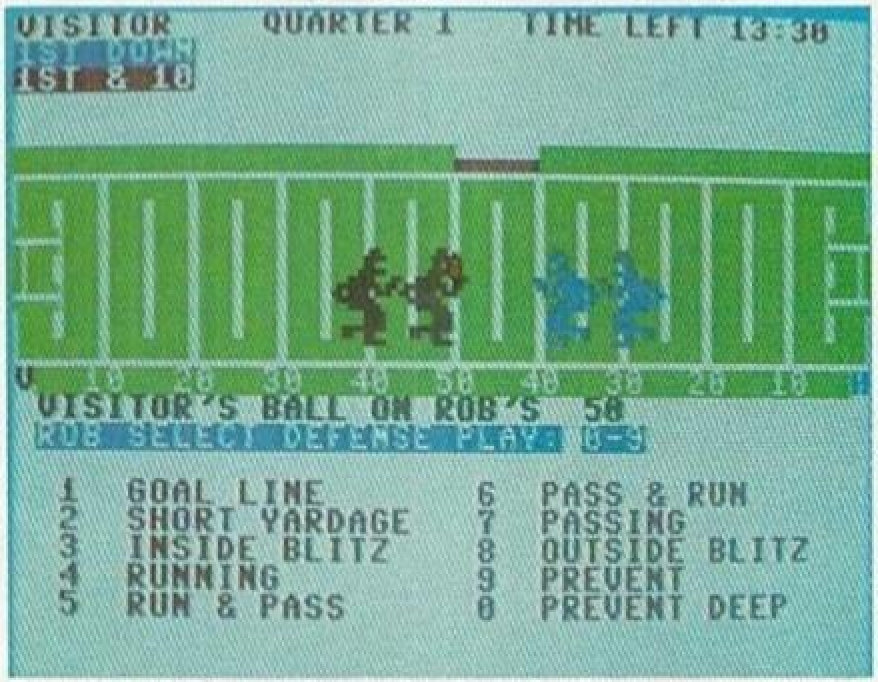
If you want on-line action and to be right down there on the field, then On-Field Football *is for you. If it's realistic strategy then go for* Computer Quarterback. *But if you want light strategy and a quick game, then pick up* Microcomputer Football.



Gamestar's *On-field Football* gives you joystick control over your players.



```
VISITOR      QUARTER 1    TIME LEFT 13:30
1ST DOWN
1ST & 10

V 10 20 30 40 50 40 30 20 10 H
 VISITOR'S BALL ON ROB'S  50
 ROB SELECT DEFENSE PLAY: 0-9

 1  GOAL LINE           6  PASS & RUN
 2  SHORT YARDAGE       7  PASSING
 3  INSIDE BLITZ        8  OUTSIDE BLITZ
 4  RUNNING             9  PREVENT
 5  RUN & PASS          0  PREVENT DEEP
```

Computer Football Strategy lets you choose your plays from a menu.

trends that your opponent may be establishing. Finally we're ready to play.

From this point on, you use only the joysticks or paddles. The left side of the screen shows a vertical 100-yard field and team names in each end zone while the top right shows the clock, scoreboard and quarter indicator. On the bottom right, you'll find the formation area. As you choose a play, the 11-man offense and 11-man defense (x's and o's) are displayed in their appropriate formation. Once plays are chosen and run, the formation area displays the offensive and defensive plays and the result.

The most remarkable thing about this simulation is the probability mechanism. An engineer by the name of Dan Bunten designed this game so whenever offense A goes against defense B, the result is C. This is based on the probability mechanism that, for instance, a draw against a safety blitz could result in an 80-yard run or a ten-yard loss. Dan also did something else quite unique. Using his experience with cybernetic systems, he has succeeded in creating an intelligent computer player. This means he has created a computer player that tracks your plays and uncovers trends in your play calling. The more games you play, the tougher the computer gets.

As incredible as this simulation is, it is not without flaws. The main problem is delays. First, there is a delay between plays which isn't too bad, but whenever you go into punt, kickoff or field goal mode, the program must go into a disk module, which causes a nerve-racking delay of a minute or so. The other problem is loading complexity. Don't expect to just load and play—it's not that simple. If you've already loaded the game and forgot to prepare a data disk, you must go back to the beginning. However, this is an exciting challenge and, like *Computer Quarterback*, does contain a statistics screen, which, in this case, can be printed out.

On-Field Football

A few years ago, Mattel came out with a football game for their Intellivision system that was unbeatable. Well, *On-Field Football* makes that game look like it was developed in the 1920's. What's unique about Gamestar's creation is the four-way scrolling. Only a portion of the field is on the screen at any one time, about 40 yards vertically and about three quarters of the field horizontally. The end zones are located up and down, thus a player may run up the scrolling screen toward the end zone and scroll right to left as he's running.

The kicking game is complete, allowing kickoffs, punts, field goals and all runbacks. Both offense and defense contain four men each and are guided via joysticks. Play calling is especially easy with the linemen, backs and receivers each having separate pass or run routes. Graphically, the game is superb and the one- or two-player option is a great feature. Score, team names, clock, 30-second timer, downs, and so on are all here along with ball position and first-down marker. Yes, even penalties and fumbles are there.

In the first-person category, this is probably one of the best football games available for any computer system. This one has to be seen.

As for which game is right for you, it's entirely dependent on what you desire. If you want on-line action and to be right down there on the field, then *On-Field Football* is for you. If it's realistic strategy you want and you're tired of bumps and bruises, then go for *Computer Quarterback*. But if you want light strategy and a quick game, then pick up *Microcomputer Football*. Whichever one you choose, you'll have hours of enjoyment. ◼

Computer Quarterback

Strategic Simulations
883 Stierlin Road
Building A-200
Mountain View, CA 94043

Computer Football Strategy

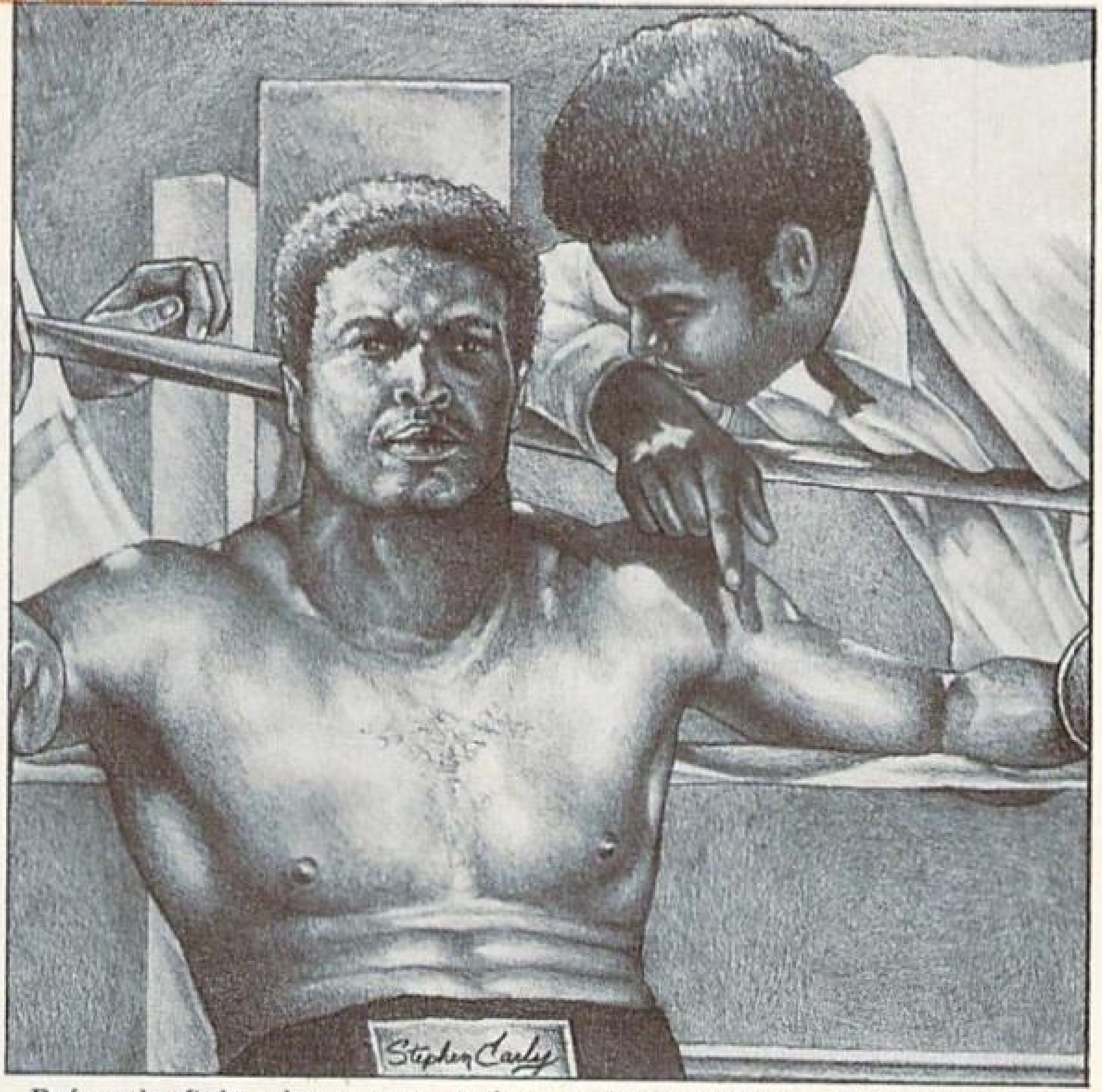
Microcomputer Games
4517 Harford Road
Baltimore, MD 21214

On-Field Football

Gamestar
1302 State Street
Santa Barbara, CA 93101

RINGSIDE SEAT

REVIEWED BY JEFF SEIKEN



Its name to the contrary, Strategic Simulations' computerized boxing game *Ringside Seat* for the Commodore 64, brings you closer than a ringside seat and right into the fighter's corner. You are the fighter's manager, controlling any one of 45 famous boxers, from the great brawler of the 1920's, Jack Dempsey, to the present heavyweight champion of the world, Larry Holmes.

Ringside Seat includes a two-sided disk—the Apple version on one side and Commodore version on the other—and a brief rule booklet. The game can be played solitaire, against the computer or against another player. In addition to the 45 historical boxers from eight different weight divisions, *Ringside Seat* also provides instructions on how to create additional boxers, either real or imaginary.

Before a fight, a player must decide the length of the bout, which can range from a three-round Olympic match-up to a full 15 rounds. There is also an option to have the judges' scores displayed either at the end of each round or only at the conclusion of the fight. Finally, if a fighter can fight as either a boxer or a slugger, the player must specify which style will be used in the bout.

For each round, the player selects strategies for the fighters: fight flat-footed, cover up, charge in, stick and move, stay away, go for the knockout, or protect cuts. Once chosen, the strategy cannot be changed during the round, except that a player can always order his fighter to cover up.

The computer depicts the fight itself in a small boxing ring in the center of the screen. Two semi-animated figures slug it out, replete with the sound effects of stinging punches and the ringing bell at the end of the round (but no cheering or hooting crowds). Beneath the ring, a blow-by-blow description of the fight (e.g., "Louis is tagged with a right cross to the face") appears on the screen at regular intervals. The computer also provides a running, though rather uninspired, color commentary on the fight. For example, "Marciano seems to be a little ahead this round." Where is Howard Cosell when we need him?

Before the fight, players can set the speed of the blow-by-blow description. This speed—either slow, medium, or fast—also determines the real-time length of each round. At the fast speed setting, which should pose no problems to anyone with average reading ability, a three-minute round takes about one and a half minutes of actual time. A 15-round match, then, can be fought in about 35 minutes.

The computer also displays onscreen each fighter's stamina, as well as any cuts the fighters may have suffered. Cuts can be closed between rounds, although they can also deepen or be reopened later. At the end of the fight, the winner is declared and the computer presents a recap of the scoring. Of course, boxers can be knocked out during a fight or the bout stopped if one of the fighters has taken too much punishment.

The statistical data for each fighter is quite comprehensive. Fighters are rated in over 25 different categories, ranging from aggressiveness to the ability to avoid injury. In a bout, though, players need be aware of none of this, as the computer performs all of the necessary calculations and computations, determining when, for instance, a fighter will throw an uppercut or clinch his opponent.

In fact, therein lies the problem: *Ringside Seat* leaves players with too little to do. Each round, the player spends perhaps ten seconds making a single decision, watches the action on the screen for the next one and a half to two minutes, and then repeats the whole process. Even choosing a fighter's strategy involves very little effort. For each fighter at the start of every round, the computer displays the seven options and a number next to each, representing how well the fighter employs that strategy. Usually two or three of the strategies stand out as far better than the others, thereby further reducing the decisions the player can make.

The appeal of the sports simulation is that it allows you to become more than a spectator. *Ringside Seat* gets you into the fighter's corner, but stops short of the ring itself.

Strategic Simulations
883 Stierlin Road
Building A-200
Mountain View, CA 94043

WHAT'S ALL THIS RACKET ABOUT COMPUTER TENNIS?

REVIEWED BY
JOHN O'BRIEN

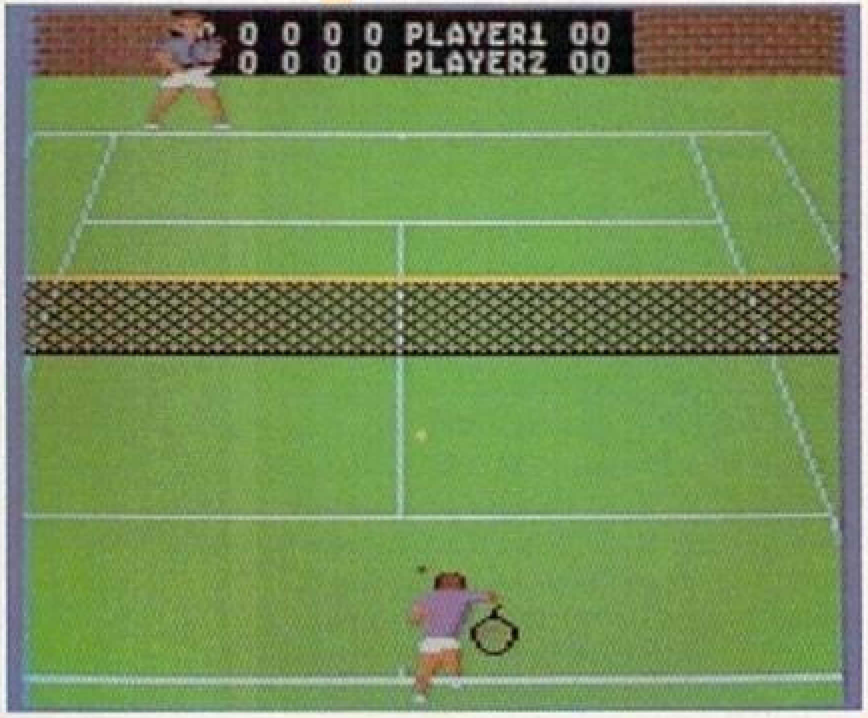
Gamestar's *On-Court Tennis* does for computer tennis what their *Star League Baseball* did for computer baseball: add real-life graphics and perspective to the sports game. Did they succeed? For the most part, yes!

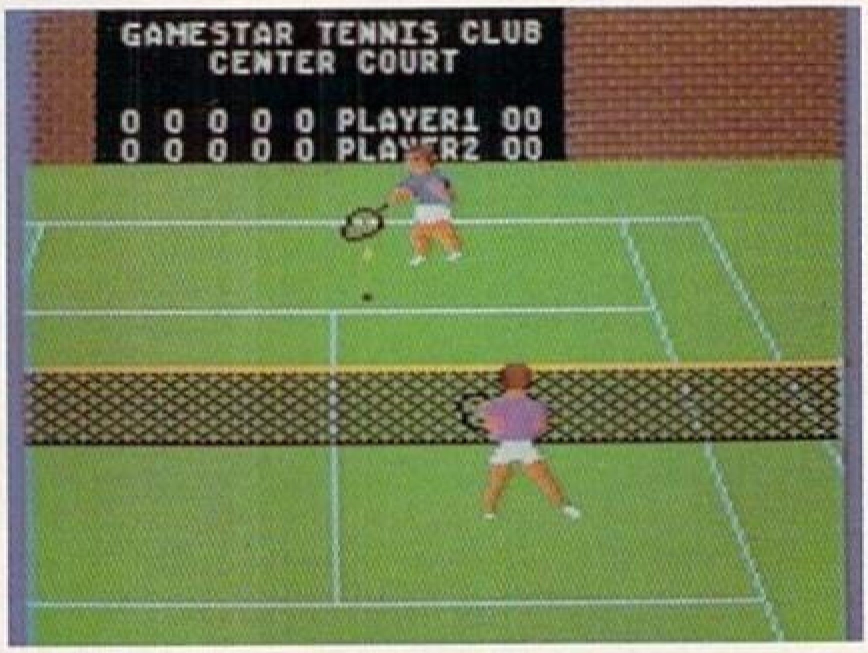
The play action is excellent. Your choice of shots is impressive, with lobs, topspins, smashes and slices. The graphics and perspective are also excellent. You might think a tennis game would be like a glorified "pong" game of old, but it certainly isn't true in this game. The perspective of the game is from behind the serving player and the players look and move realistically.

This is a game that offers many options. When you start, you can just play a warm up (one set), two out of three sets or three out of five sets. You also get a choice of the type of surface: grass, clay or hard court. They all affect the speed and bounce of the ball, so you might want to play clay first, because it's the slowest or hard court because it's the most consistent.

You can also choose what type of player you'd like to be, or, if you're playing against the computer, what type of player you'd like to play against. There are four styles of player you can choose from and they all have names and play styles similar to famous tennis pros. For example, John Ringler has a great backhand and comes to the net often but sometimes is known to have temper tantrums in tough games. (Hmm, I wonder what famous player he was modeled after.)

The key to the whole game is to time and master the joystick maneuvers.





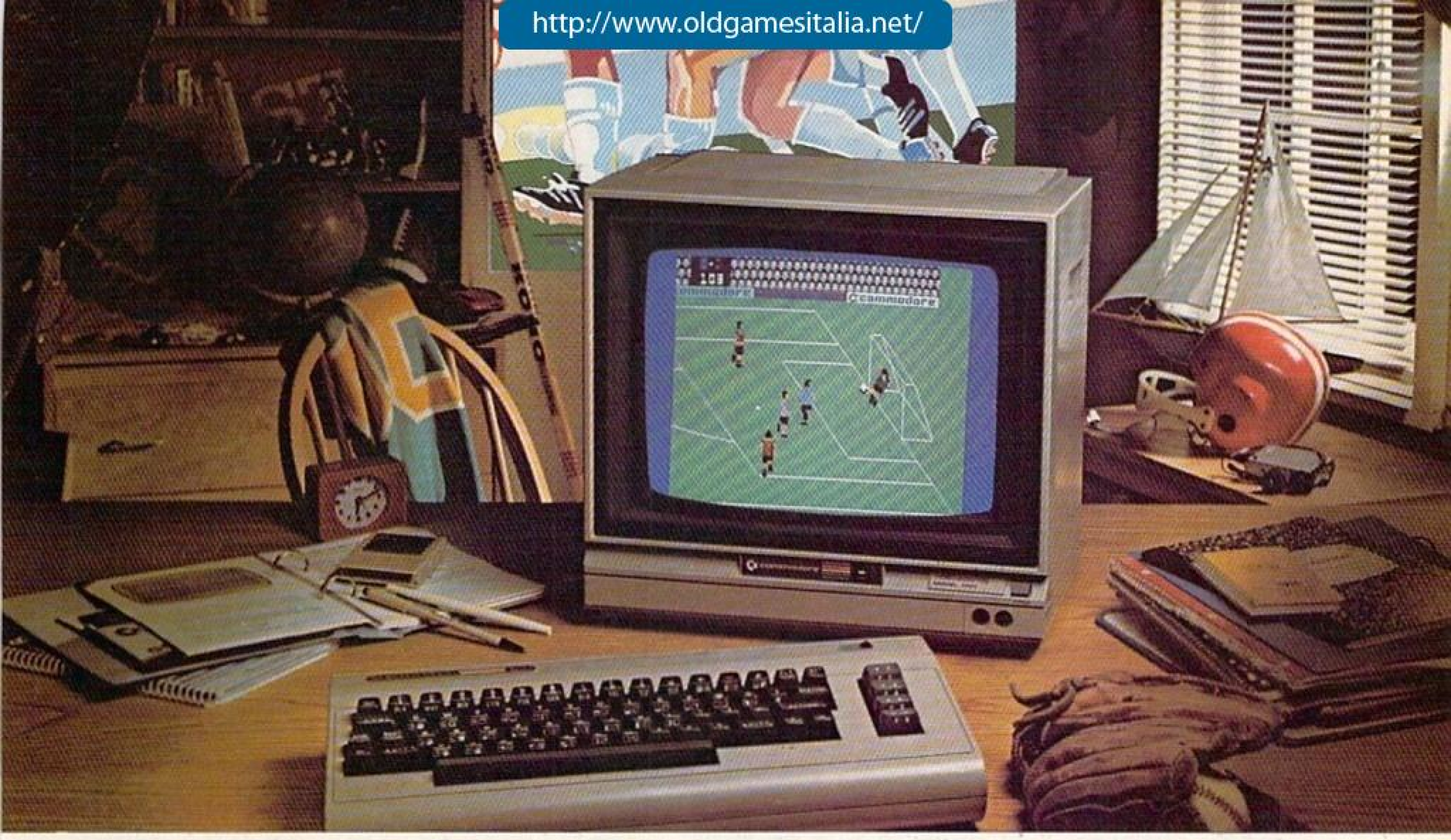
The key to the whole game is to time and master the joystick maneuvers. This can be particularly frustrating when you want to do a smash and you inadvertently use the lob maneuver or you miss the serve seven or eight times in a row. And serving can be so tough that in most first games, whoever is serving will usually lose the set. In fact, the definition of "endless love" is me attempting to learn how to serve. But once you master your serves and racket strokes, you still have to use strategy to win. Get to know your opponent's weaknesses and exploit them.

The game has two unusual features. One is that you never have to move your player. He will automatically move to where the ball is. This is good because you can concentrate completely on the type of shot you want to use. But sometimes it doesn't work and your player doesn't get to the right spot in time. Since this is usually how it really happens in tennis, it's really not that bad. But it does make you feel helpless at times because you have no control.

The other unusual feature is that instead of having standard play levels that you choose, the game automatically adjusts to your playing level. If you are playing poorly, it will play easy and as you get better, it increases in difficulty. The idea is commendable, but in actual practice it can be frustrating, because you can't see your progress like in other games where you choose a level yourself.

Still, it looks as though Gamestar has another hit on their hands. *On-Court Tennis* is smashing. ■

Gamestar
1302 State Street
Santa Barbara, CA 93101

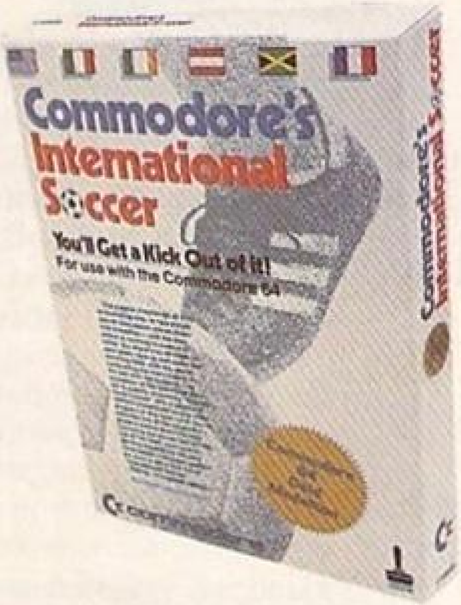


In A League Of Its Own

International Soccer gives you all of the world-class soccer excitement you crave, whether you're competing against a fellow soccer fan or one of the nine difficulty levels of the computer. Head the ball to teammates. Dribble through oncoming defensemen. Perform throw-ins or cornerkicks. All of the features of the real game are within your control.

And just like the real game, **International Soccer** gives you a goalie that can provide that momentum changing spark. Sliding stops. Diving blocks. Leaping saves. Movement so real you'll swear he was alive. There's even an award celebration at the end of the game to congratulate the winners!

If it's realistic sports games that you enjoy, **International Soccer** is the best available. So good in fact, that it's in a league of its own.


Commodore's International Soccer
You'll Get a Kick Out of it!
For use with the Commodore 64
Commodore's International Soccer

COMMODORE

RECREATIONAL SOFTWARE

suggested retail price $24.95
AVAILABLE ONLY FOR THE COMMODORE 64
Cartridge Based Software

COMMODORE ANNOUNCES TWO NEW COMPUTERS AT CONSUMER ELECTRONICS SHOW

New hardware and third-party software for the Commodore 64 also introduced.

BY DIANE LEBOLD

Commodore's new Commodore 128 personal computer (compatible with the 64) and LCD lap computer were both top news at the Consumer Electronics Show held in Las Vegas in early January.

Twice a year—in January and June—scions of the electronics industry gather at the Consumer Electronics Show (CES) to show off their newest wares. This January's show turned up many terrific new Commodore-related products from both Commodore itself and independent developers of peripherals and software.

The Commodore 128 and LCD Computers

The Commodore 128 is the full-color personal computer many enthusiasts have been waiting for. It is compatible with the Commodore 64, has a true 80-column mode, runs existing Commodore serial peripherals and, additionally, is compatible with two fast disk drives also introduced by Commodore at the show (see below). It operates in three distinct configurations: 64 configuration, 128 configuration and CP/M™ configuration.

In 64 configuration the Commodore 128, very simply put, *is* a Commodore 64. It has a 40-column screen, sprites, 64K RAM, operates the VIC II video chip and SID sound chip and is compatible with all existing software for the Commodore 64. In this mode, the C128 runs Commodore's 1541 disk drive, all modems designed for the 64, Commodore's 1526 and MPS-series printers, and any other serial device.

In 128 configuration the Commodore 128 taps into 128K of RAM and BASIC 7.0—a very powerful version of BASIC that includes all the graphics and sound commands of Commodore's **Super Expander** and **Simons' BASIC** cartridges. In this configuration you have access to both a 40-column screen display and an 80-column (640 × 200 pixels) display. (The 80-column display requires an RGBI monitor like the one introduced by Commodore at the show and described below.) In this configuration the C128 operates Commodore's new fast drives (see below) and is compatible with existing modems and serial devices.

Finally, the C128's CP/M configuration allows access to hundreds of excellent business programs already in existence. Used with Commodore's new fast drives, this configuration will run common CP/M disk formats without conversion.

Commodore's LCD Lap Computer

Weighing in at about five pounds, with eight software packages and a modem built in, this battery-powered notebook-size computer is excellent for anyone who travels or simply likes to work in a remote room in their house. It has an 80-column by 16-line liquid crystal display that (unlike many others in this genre) is easy on the eyes. It is compatible with existing Commodore peripherals, and will be priced very competitively.

The LCD's built-in integrated software includes a word processor, file manager, spreadsheet, address book, appointment book with alarm, memo pad, calculator, and terminal software for using the 300-baud built-in modem.

Commodore Peripherals Introduced

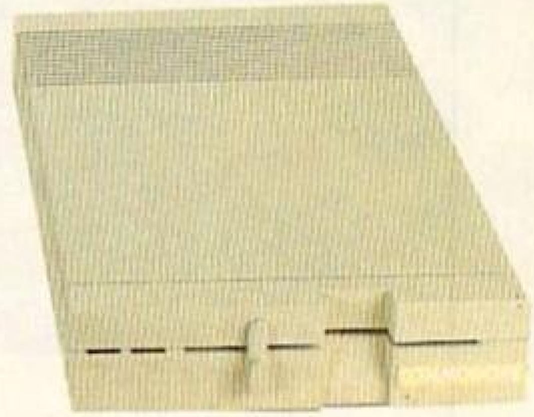
Commodore also introduced two fast drives—model 1571 (single drive) and model 1572 (dual drive)—as well as a new RGBI/composite monitor, two new modems and a mouse.

Both of the new drives run in three modes: 1541 mode (data transfer rate of 300 characters per second), fast mode (1500 cps) and CP/M mode (3500 cps). In addition, they can operate in a "burst" mode of 4000 cps. In 1541 mode they are completely compatible with existing Commodore 64 software. Both drives operate with the Commodore 128, Commodore 64, Plus/4 and Commodore 16 computers.

Commodore's new color monitor, model 1902, provides better resolution than most standard television sets or monitors. It supports both 40- and 80-column displays and requires no special cables or interfaces. The 1902 is compatible with all computers using RGBI or composite output.

The new 1660 Modem/300 introduced by Commodore is a direct-connect modem that operates at 300-baud transfer rates. It features auto-dial/auto-answer and a built-in speaker, and it can be used with both touch tone and rotary telephones. The 1670 Modem/1200 has all the features of the 1660 but uses 1200-baud high-speed data transfer instead of 300-baud. Both modems are for use with the Commodore 128, Commodore 64 and Plus/4.

The LCD's built-in integrated software includes a word processor, file manager, spreadsheet, address book, appointment book with alarm, memo pad, calculator, and terminal software for using the 300-baud built-in modem.



Commodore's new single fast drive is one of several new peripherals introduced at CES.

The Commodore 128 personal computer is compatible with the popular Commodore 64.

Commodore Software for the C128

To kick off software support for the C128, Commodore introduced the **Perfect™** line of applications software. This popular series, produced by Thorn EMI Computer Software, Inc., includes a word processor, spreadsheet and file manager. All the programs feature pop-up menus in simple English, split screen windows and automatic formatting for printing. They operate with the Commodore 128 in the 80-column CP/M configuration.

In addition, Commodore announced **Jane 2.0™** picture-driven software for the C128. **Jane,** produced by Arktronics, Inc., is a fully integrated system that includes a word processor, spreadsheet and file manager. It uses a joystick or a mouse to point to icons, thus eliminating complex commands and keyboard frustration, and features pop-up menus and colored windows. It runs on both the Commodore 128 (in 128 configuration) and the Commodore 64.

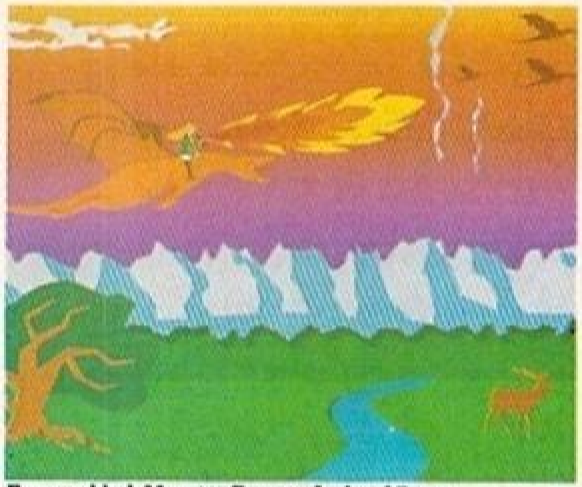
New Trends in Games for the Commodore 64

The trend away from traditional shoot-em-ups and toward creative, non-violent play was very evident in the new games introduced at the show. New strategy games, interactive fiction, "construction" games and non-competitive "computer activity toys" for the Commodore 64 dominated the screens at most game company booths.

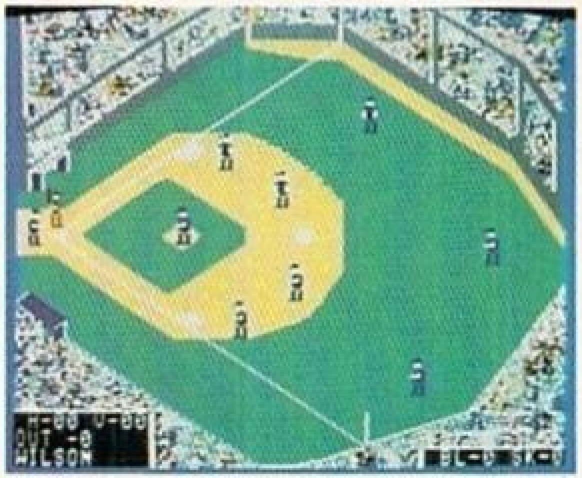
In fact, very few companies introduced new arcade/action games, and several software developers predicted that consumers in 1985 will seek out sophisticated "thinking" games, rather than continue to choose "eye/hand coordination" games. The trend, in fact, has already begun, as adventure/strategy games and interactive fiction edge out arcade games on the software "hot lists."

Among the outstanding new Commodore 64 games introduced at the show were **Mail Order Monsters, Adventure Construction Set** and **Racing Destruction Set** from Electronic Arts; **Suspect** and **Cutthroats** interactive fiction from Infocom; **Pro**

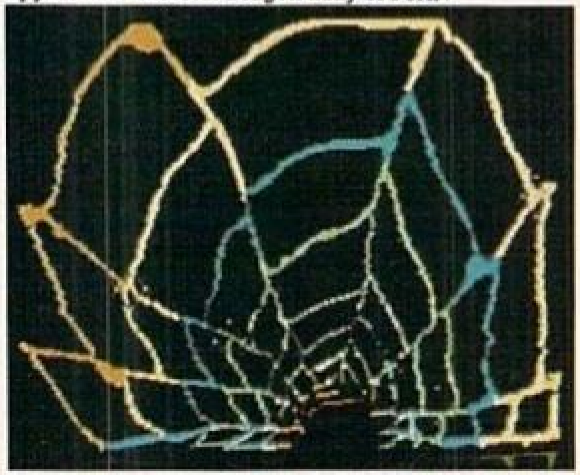
The trend away from traditional shoot-em-ups and toward creative, non-violent play was very evident in the new games introduced at the show.



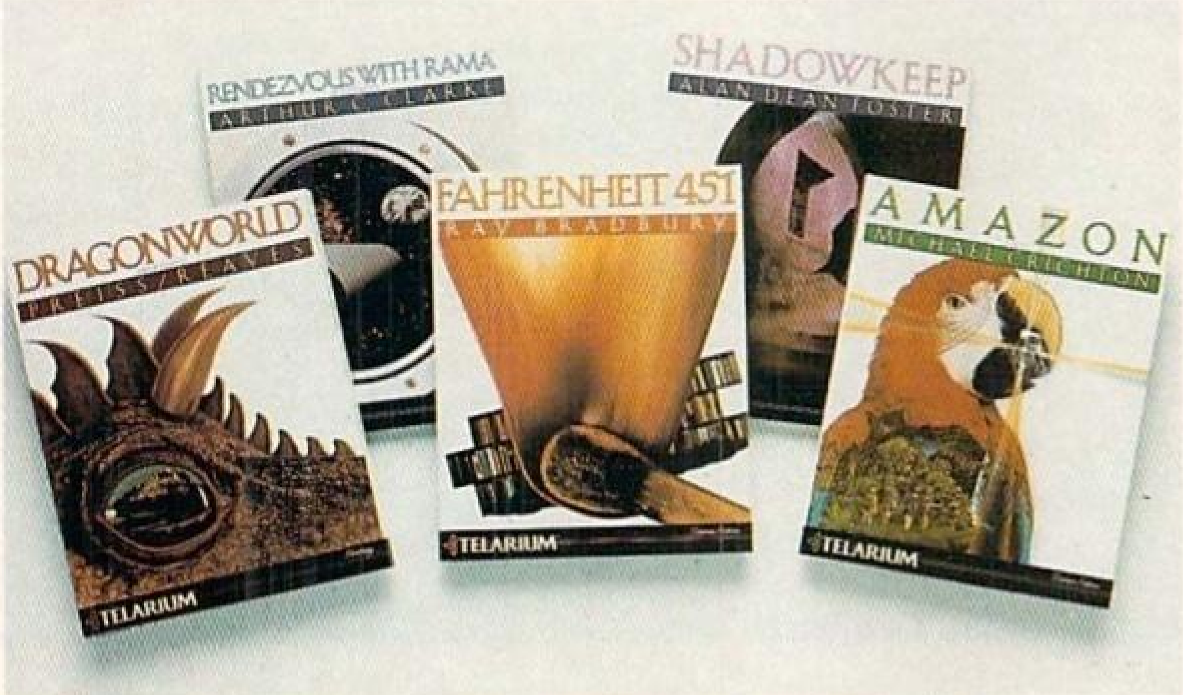
Epyx added *Moreta: Dragon Lady of Pern*.



The World's Greatest Baseball Game



You cannot lose in Activision's *Web Dimension*.



Telarium interactive fiction from Spinnaker is written by well known science fiction authors.

Football strategy/simulaton from Avalon-Hill Microcomputer Games; and **Summer Games II** and **Moreta: Dragon Lady of Pern** from Epyx. There were rumors that the three-dimensional Lucasfilm games titled **Rescue on Fractalus** and **Ballblazer**—originally created for Atari computers by the game division at Lucasfilm but never released—might also be marketed by Epyx for the Commodore 64 later this year in the wake of Atarisoft's withdrawal from the market.

In addition, Spinnaker showed its newly renamed **Telarium** series of interactive fiction. These games, based on science fiction books from writers like Ray Bradbury and Michael Crichton, were originally called the Trillium series.

Electronic Arts' **Mail Order Monsters** is a combination construction set and action game. Once you put your monster together and provide it with weapons and supplies, you take it into an **Archon**-like battle, where the outcome is determined partly by your joystick skill and partly by the characteristics and weapons of your monster.

In Electronic Arts' new **Racing Destruction Set,** you create a custom vehicle—stock car, formula racer, dirt bike or whatever—and build a racetrack with jumps, hairpins, hills, ice, dirt. Then, of course, you race—against a live opponent or the computer. A unique feature of this game is its split-screen display.

Finally, **Adventure Construction Set** from Electronic Arts offers a library of over 500 pre-built creatures, props and sound effects, eight creature personalities, magic spells and more, letting you create an adventure game containing up to 240 rooms, 500 different creatures and 7500 props. Those who get good at using this creative "adventure processor" might want to try for the $1000 prize offered in EA's "Create your own adventure" contest, running through October 1 of this year.

Infocom, one of the original and most successful producers of complex interactive fiction (**Zork, Deadline,** etc.), is still holding fast to its belief that graphics detract from, rather than enhance, good computer fiction. (Their rationale is that you create the best graphics in your head—which is probably true.) Its newest offering, also being marketed by Commodore for the Commodore 64, is **Suspect,** a mystery thriller in the tradition of **Deadline** and **The Witness. Cutthroats,** another recent Infocom release, is a "tale of adventure" in which you are a diver hired by a disreputable crew to locate sunken treasure. Both are, in the Infocom tradition, text-only.

From Quest, Inc., designers of **The World's Greatest Baseball Game** (marketed by Epyx), has come a football equivalent titled **Pro Football.** This one is being marketed by Avalon-Hill Microcomputer Games as a strategy game and looks like an excellent choice for those who like to play the actual statistics of real teams. It allows you to play real Super Bowls from the past, pit any two teams against each other, draft your own teams, and trade players. When you play against the computer, watch out—in this mode the computer learns your successful patterns and begins to counteract them. Sound like artificial intelligence?

Two new offerings from Epyx expand on software that has already proven successful. **Summer Games II** adds eight new events to the company's original **Summer Games** Olympics simulation. And **Moreta: Dragon Lady of Pern** is Epyx's latest addition to its **Dragonriders of Pern** strategy/action series, based on the novels by Ann McCaffrey. Epyx will also be releasing a flying game titled **The Right Stuff** and an unusual simulation titled **FBI,** which provides you with the actual tests you would take to qualify as an FBI agent.

Spinnaker's **Telarium** series, which was released for Apple Computers last October as the Trillium series, will be released in force for the Commodore 64 this spring. This interactive fiction, based on novels like **Fahrenheit 451, Dragonworld** and **Shadowkeep,** differs from others in its genre, according to Spinnaker, in that it is plot- and character-oriented, not "puzzle-based." That means if you make logical choices based on what you know, you can make progress—rather than being stuck trying to out-guess the programmer in a series of word games.

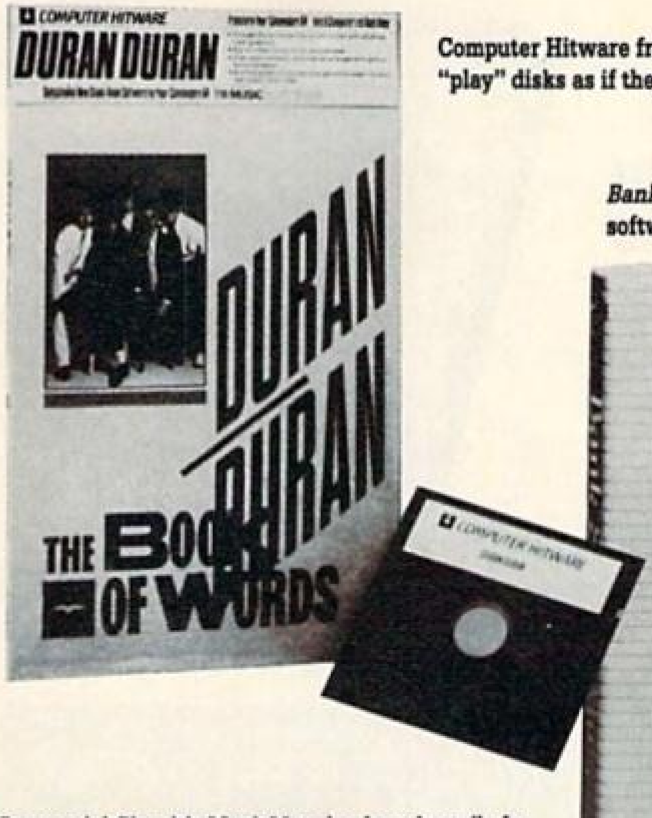
Other items of interest to gamers include a series of very inexpensive (would you believe $9.95?) disk-based games from a British company called Mastertronics soon to be widely available in the U.S., and a number of noncompetitive games from Activision, in which you have an infinite number of lives and/or simply cannot lose. The new Activision games include **Web Dimension,** featuring original music by composer Russell Lieblich; **Master of the Lamps,** by Lieblich and Peter Kaminsky, in which you must induce a genii to return to his lamp; and **Fireworks,** in which you create your own custom fireworks.

Music and Graphics for the Commodore 64

Music and graphics for the 64—hardware and software—have reached new heights of sophistication. At the January show several companies announced new "beginner" keyboards for the 64, including the $99 **MusicMate** from Sequential Circuits and the $199 **Soundchaser 64** from Passport Designs. Both keyboards have software available to help the novice play, compose and save music. Sequential Circuits' new **Max** keyboard, on the other hand, is a full-blown professional synthesizer designed for use exclusively with the 64.

New music composition software introduced at the show includes **The Music Studio** from Activision, **The Music Shop** from Broderbund and **Bank Street Music Writer** from Mindscape. To promote sales Broderbund is offering a free Hohner harmonica to buyers of its **Music Shop** software.

Passport Designs, in addition to its Soundchaser 64 keyboard and **MacMusic** software ($49.95) for the 64, introduced a line of pre-programmed music "albums" on disk. Dubbed **Computer Hitware**, the first disks released in January include music by Duran Duran. These will be followed by disks of music by Bruce Springsteen, The Police and Van Halen. Since the software "plays" the 64's SID chip, you don't need any other equipment—you simply load and run the program. The series is a joint venture with Hal Leonard Music Publishing, and includes a book of photos and lyrics with each release. Each package retails for $19.95.



Computer Hitware from Passport Designs lets you "play" disks as if they were records.

Bank Street
MUSIC
Writer
by Glen Clancy

***Bank Street Music Writer* is new music composition software from Mindscape.**

Sequential Circuit's MusicMate keyboard retails for only $99.

Graphics packages of note introduced at the show include a very inexpensive ($29.95) touch tablet called **Super Sketch** and a nifty "make-your-own-greeting-cards-banners-stationery-or-anything-else" package from Broderbund titled **The Print Shop.** The Broderbund software lets you create custom graphics for many purposes using simple menus. It even comes with colored pinfeed paper and matching envelopes.

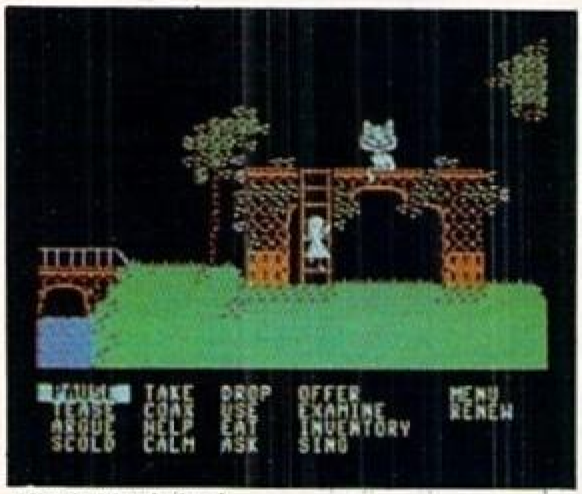
Software for Children/Education

Since software for children almost always has some kind of educational

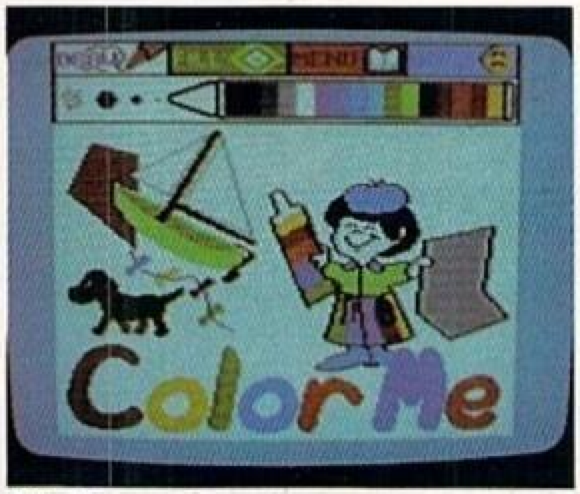
The Consumer Electronics Show may happen only in January and June, but its effects ripple through the industry all the rest of the year.

Bank Street StoryBook
by George Brackett
PIXELWORKS

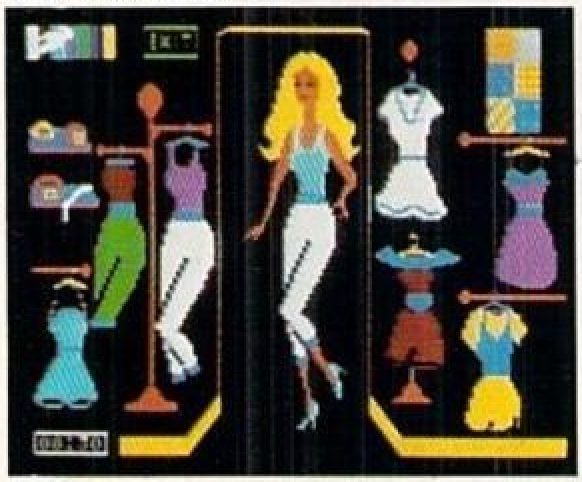
Mindscape's *Bank Street StoryBook* allows children to write and illustrate their own stories.



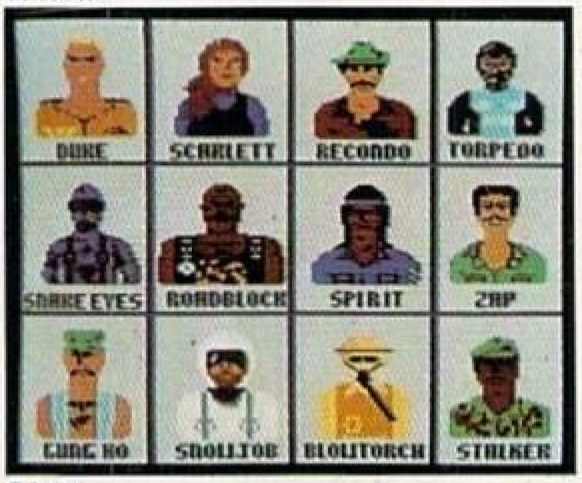
Alice in Wonderland



Color Me



Barbie



G.I. Joe

purpose, and educational software is almost always for children, we're lumping the two together here.

Topnotch software in this category, newly available for the Commodore 64, includes the **Windham Classics** series of interactive fiction and the **Fisher-Price** series of games for very young children, both from Spinnaker; **Chipwits** and the **Computer Activity Toys** series from Epyx; **Color Me** and **Show Director** from Mindscape; and **Sea Voyagers** and **Dream House** from CBS. For older children, CBS introduced its **Mastering the SAT** and **Mastering the ACT** programs and Prentice-Hall announced its **Arrakis Advantage** instructional software for math and science.

Spinnaker's **Windham Classics** series of interactive fiction for children aged ten to 14 is based on five classic children's books, including **Alice in Wonderland, Wizard of Oz, Below the Root, Swiss Family Robinson** and **Treasure Island.** Each adventure is non-violent and does not allow the player to die. The company's **Fisher-Price** games, first introduced last summer, are aimed at children aged three to 12 and were tested extensively by Fisher-Price for ease of use, durability and educational value. Newly added to the Fisher-Price series are the **Song Maker** for ages four to eight, **Cartoon Programmer** for ages five to ten and **Movie Creator** for ages six to 12.

Epyx's new **Chipwits** educational game for the 64 teaches children aged eight and up the principles of computer programming. Using LOGO-like logic and icon commands, the player programs an on-screen robot to perform increasingly complex tasks. The company's **Computer Activity Toys** programs for the 64 are designed to be just that—toys. Including three titles right now—**G.I. Joe, Barbie** and **Hot Wheels**—the point of the programs is simply to create an environment for play. For instance, a child using the **Barbie** toy can select Barbie's wardrobe and hairdo for a date with Ken.

Mindscape's newest introduction for children, **ColorMe,** is a "computer coloring kit." The child uses a joystick or other controller to construct a picture from a selection of backgrounds and characters, then fills in the colors and adds text. The characters are licensed from Hallmark, and include Rainbow Brite,™ the Shirt Tales™ and the Hugga Bunch™. The main program is newly available on disk for the 64 at $29.95, and Mindscape will be offering additional picture disks for $9.95 each. Mindscape also introduced two "story processors" for youngsters of all ages, one titled **Show Director** and the other **Bank Street StoryBook.** Both allow a child to write a story and illustrate it, selecting from a variety of backgrounds and characters.

The Sea Voyagers introduced by CBS Software is designed to add excitement to learning about famous explorers. The first part is a tutorial that introduces the user to 30 different explorers, including Hernando Cortes, Sir Francis Drake, John Cabot and, of course, Christopher Columbus. The second part is a game in which the student guesses the explorer from hints provided by the program. The company's new college prep programs, **Mastering the ACT** and **Mastering the SAT,** are self-paced study programs for these two crucial college entrance tests and include error analyses and workbooks.

Finally, for grades seven through 12, Prentice-Hall introduced the **Arrakis Advantage** series to help strengthen skills in math and science. The programs use sound effects and animated graphics, and allow the student to interrupt at any time to ask questions. The series will be available for the first time this spring.

Applications Software for the Commodore 64

One of the more unusual applications packages introduced for the 64 is **Forecast!** from CBS Software, an at-home weather station that allows families to predict the weather using the same methods as professionals. The program was developed by professional meteorologists and provides scientific explanations for weather conditions and resources for further study.

Productivity software shown for the first time included **Trio,** an integrated word processor/spreadsheet/data base from Softsync; **Home Pak,** word processor/information manager/terminal software from Batteries Included; the **Better Working** series from Spinnaker; the **Sylvia Porter Personal Finance** series from Timeworks; and **SkiWriter II** word processor/terminal software from Prentice-Hall.

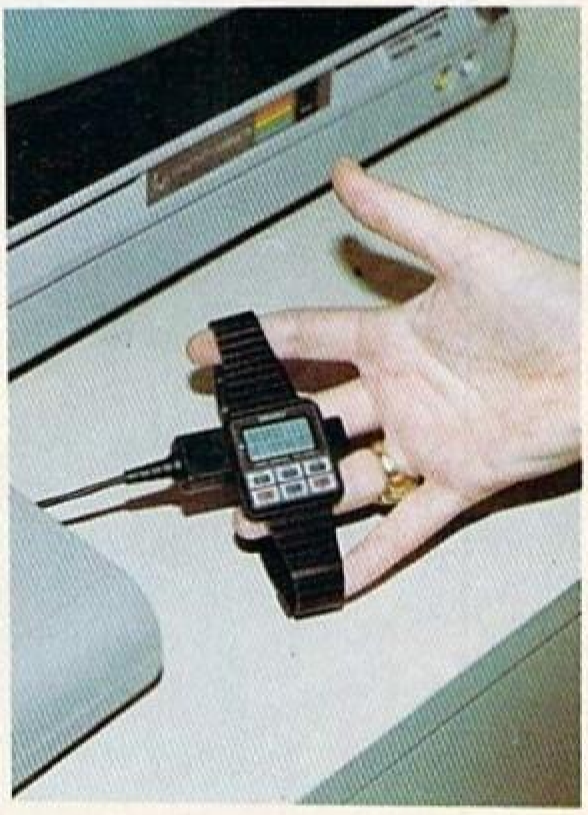
The entire **Trio** package retails for $69.95 and includes a full-featured word processor, 60-column by 40-line spreadsheet, and a small but effective database manager. This is significantly less expensive than most other productivity packages of approximately the same capacity.

Commodore 64 Compatible Hardware

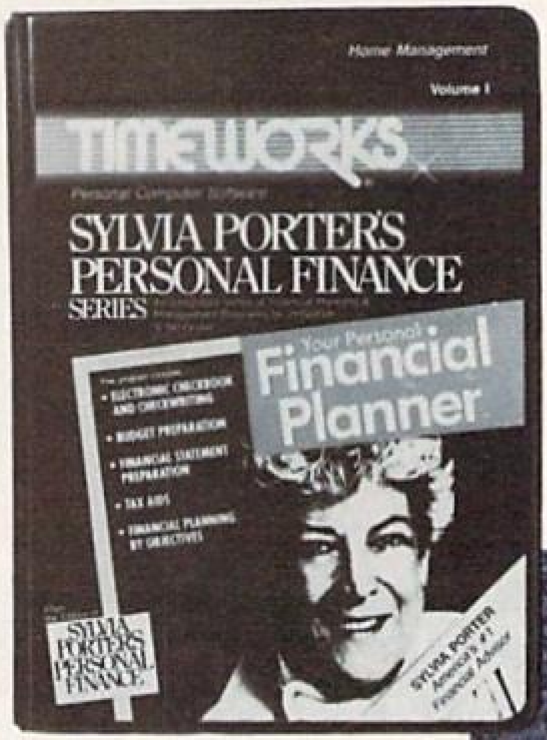
Cardco, a foremost manufacturer of 64-compatible hardware, introduced a new fast drive at the show and **Olympia** (the typewriter people) introduced a very inexpensive dot matrix printer. In addition, the **Legend** dot matrix printer was introduced, featuring square dots that create cleaner looking characters. Square dots fit together better than round ones, and almost simulate letter-quality printing.

Also of interest to serious users of Commodore 64-compatible printers is a new parallel interface introduced by **Apricorn**. What makes this interface worth mentioning is a special "listing" mode, in which the interface translates Commodore graphic characters into English. So, instead of, for instance, printing out a reversed heart character in a program listing, the Apricorn interface will print out the words CLEAR/HOME. This should be good news for users who find reverse graphic characters difficult to decipher in program listings.

You wear it on your wrist like a watch and it does tell the time—but with its on-board microprocessor and 2K RAM, it's also manager of 12 different files.



Seiko's PC Datagraph lets you carry your appointment book on your wrist.

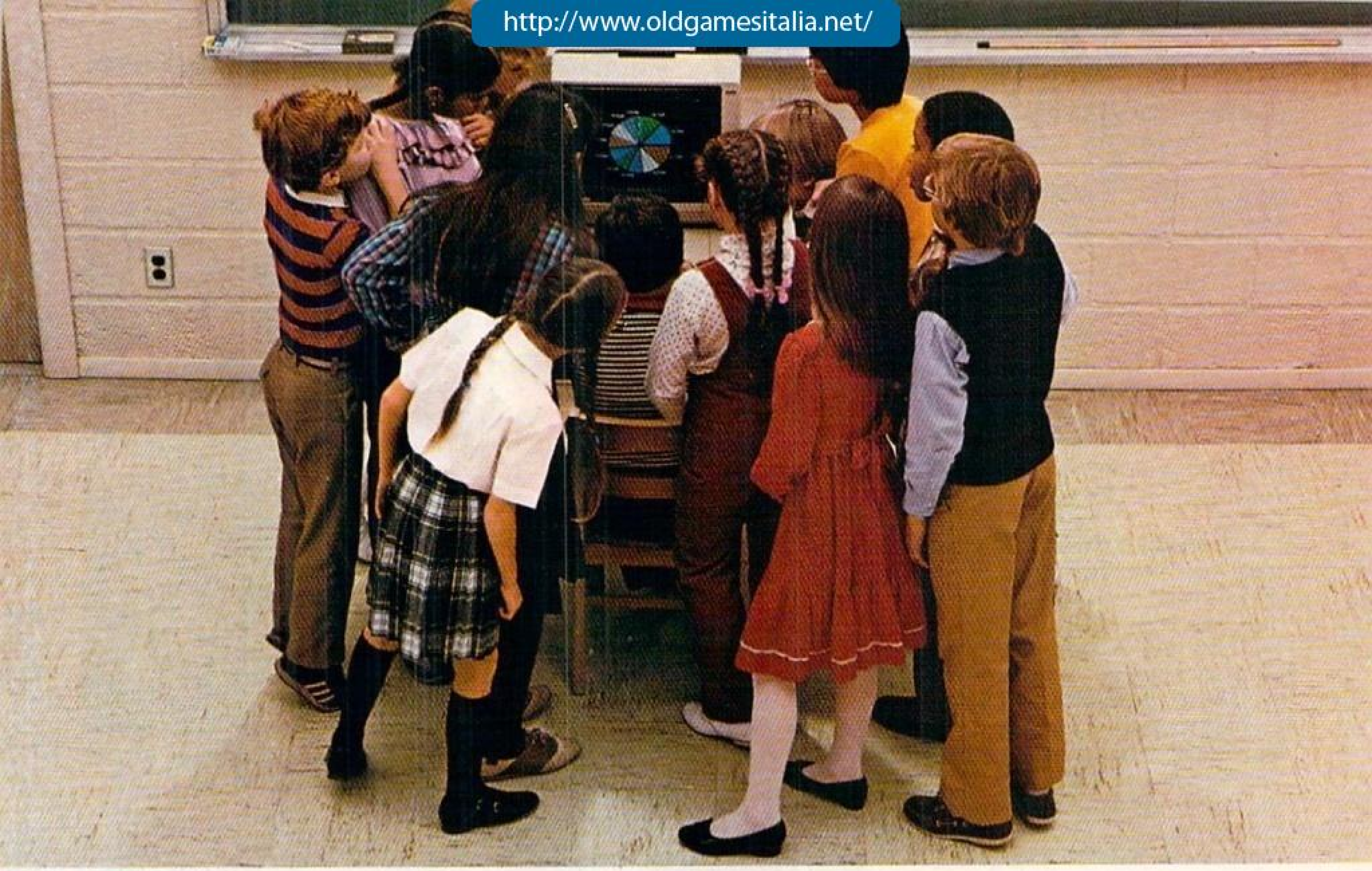

Home Management
Volume I
TIMEWORKS
SYLVIA PORTER'S PERSONAL FINANCE SERIES
Your Personal Financial Planner

Timeworks introduced a new line of personal finance software from financial expert Sylvia Porter.

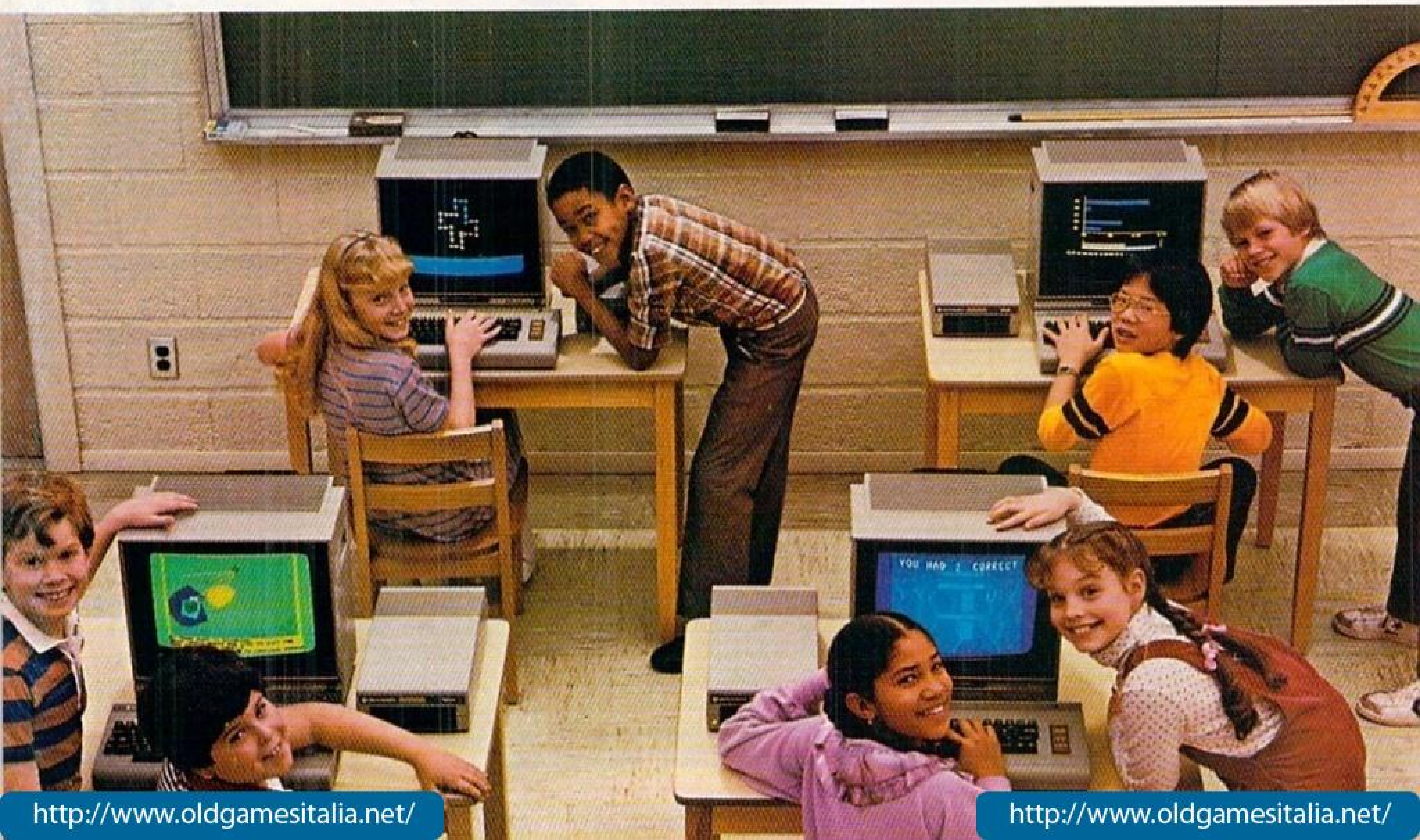
A new parallel interface from Apricorn translates Commodore graphic characters into English.

Finally, who can avoid mentioning the Commodore 64-compatible **PC Datagraph** introduced at the show by Seiko—yes, the watch company. You wear it on your wrist like a watch and it does tell the time—in 80 cities around the world, in fact. But with its on-board microprocessor and 2K RAM, it's also manager of 12 different files—your phone and address lists, your appointment book or whatever else you may need. Just enter or update your files on your 64 using the Seiko software, and upload them via the RS-232 cable that comes with the Datagraph. Look for the PC Datagraph in computer stores or the electronics sections of department stores—not in jewelry or watch stores. It should retail for about $120.

Keep in mind that this summary covers only highlights of the new Commodore-related products unveiled at the January show. There were many others in addition to those mentioned here, at least some of which will continue to show up in our pages in reviews, so stay tuned. The Consumer Electronics Show may happen only in January and June, but its effects ripple through the industry all the rest of the year.



WHY THE COMMODORE 64 ISN'T IN A CLASS BY ITSELF.


YOU HAD 1 CORRECT

At Commodore, we think it's easier for school children to learn about a computer by using it rather than by waiting to use it.

So, we sell the Commodore 64™ at about half the cost of comparable computers.

With the money you save on the Commodore 64, you can afford the things you'll really need: more Commodore 64's.

In fact you can create a powerful but economical "Local Network" with 8 computers sharing one disc drive.

The Commodore 64 features: 64K memory, 66 key typewriter-style keyboard, 16 color high resolution graphics, 9 octave music synthesizer and 3-dimensional sprites.

And the same commitment we make to hardware, we're making to software. We have highly rated Logo and PILOT programs. Much of the well recognized MECC™ courseware and the Edufun™ Series from Milliken will soon be available. There are hundreds of other programs, including a wealth of public domain software for the Commodore 64. Our newest additions are 30 early learning programs from Midwest Software.

So you see, the all purpose Commodore 64 really is in a class by itself.

For further information on the Commodore 64 and our 250 Educational Resource Centers, contact your nearest Commodore Education Dealer.

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OPERATION?(+,-,S)
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BY JERRY A. STURDIVANT

Bit Banner
for the Commodore 64 and PET

In this program you select the height and width of the character and the print symbol you wish and the program does all the work.

A banner program lets you print a message sideways, in big letters, on your printer. You can type a word like WELCOME and have large, 7¾-inch high letters, spread out on three or four sheets of printer paper.

The problem with banner programs is that you have to design each character in the program to the size and print symbol you want. And of course the program is large, to hold all the letters.

Not so in this program. In this program you select the height and width of the character and the print symbol you wish and the program does all the work. It can print short fat letters, one inch high and two feet wide. Or tall skinny ones, one inch wide and 7/34 inches tall.

There are 51 characters that can be used in this program. They are from ASCII 40 to ASCII 90 (the left parenthesis to the letter Z) excluding the comma (I made that into a space). They are the characters indicated in line 320 of the listing. If you wish, you can make some of these into special characters of your own.

The operation of the program is involved. Nearly all the characters are pixeled the same as the computer's own built-in character set. I took a five-by-seven format and bit mapped each character. Each character has 35 possible pixels that can be "on" or "off."

Figure 1 shows the bit mapping procedure for the letter F. The first column, column 0, has each row (row zero to six) "on." Any pixel that is on in row zero has the value of one. Any on in the next row has the value of two. The next row up, four, the next eight, and so on to row six. Any pixel on in that row has the value of 64.

The values are then added, and the number written at the top. Because column zero has all the bits on in the rows, the value for that column is 127. The next column over, column one, has a bit on in rows three and six. Total value for that column is 72 (8+64). The 35 bits of the character F can now be represented by five numbers 127, 72, 72,72, 64.

The 51 characters that can be used in the program can now be represented by 255 numbers (five times 51). The 255 numbers are placed into data statements to be read into a string (A$).

The Operation

Lines 30 to 270 are the input screen for selecting the character size and print symbol.

Lines 290 to 550 are the editor for the message you want printed. Because this editor makes each screen line a dimensioned string, lines 560 to 580 place them into one string when finished.

Line 600 starts the main loop, which makes each letter of the message, one at a time, for processing. N in line 610 is the ASCII of the letter, minus 39. (The rest of line 610 is in case the letter is a space.) N tells us where, in A$, the five numbers are that represent that letter. F$ in line 620 becomes those five numbers from A$, in string form.

The loop in lines 630 to 650 takes each of the numbers in F$ and places the code number in the B dimension.

The loops in lines 660 to 700, decode each B dimension (number at the top of a column) into the column's seven rows. This gives us 35 each of L(C,R), telling us whether that LETTER(COLUMN,ROW) is on or off.

Line 710 is a line feed which takes up any slack in the printer paper, to make the first two lines match properly.

The loop at 720 will print the five columns of the letter. Line 730 will repeat each column as many times as you selected the width of the letter to be. Line 740 is the margin for spacing the letter over on the printer paper. This is for moving smaller letters to the center.

Line 770 will be the rows. Line 780, the H loop, is for the height of our character, or how many times each row prints across the paper. Eleven is the maximum for each row, for 8½-inch wide paper. Line 790, which is nested inside five loops, decides if the row is on or off. If L(C,R)=1 we want to print our symbol. If not, we want nothing printed.

Lines 810 and 820 are for a printer pause. Good for letting the head cool or to change ribbons; space bar to stop, then space bar to restart.

Line 840 is the line feed to advance the printer paper up a line. Loop 860 to 880 is also line feeds, and puts the spaces between the big letters.

Running the Program

Line 270 asks you for a symbol. The letter X is a good one. I would suggest you do not use the solid character (the Commodore logo and plus symbol) for very large letters. Your printer head may get hot. I use the period or X for the largest letters.

For using the solid character on the printer, it looks good if you can get your printer to print 12 lines per inch rather than six. You will have to read your printer manual for this line feed information. Following are those changes for various printers.

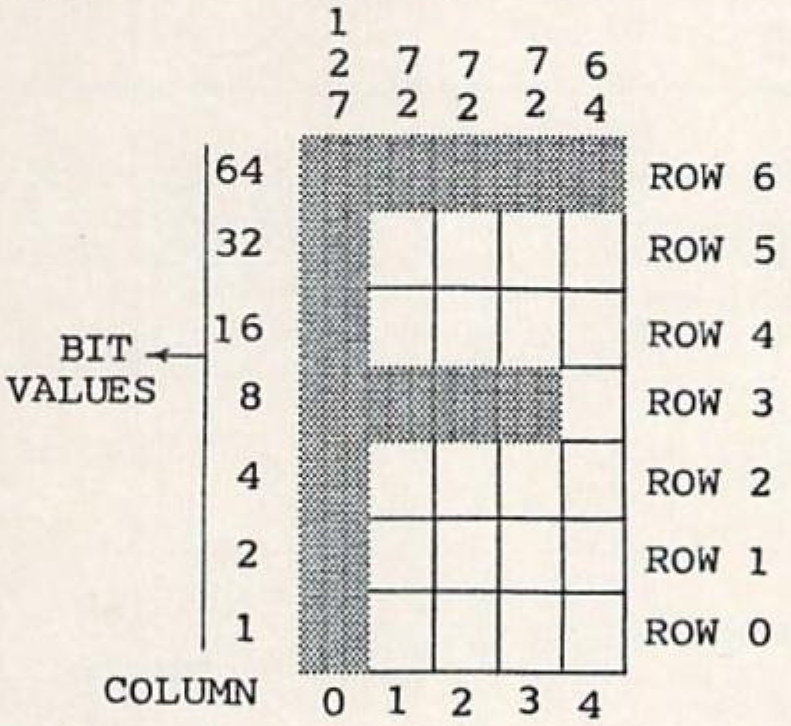
1525 PRINTER

```
Line 730 PRINT#4,CHR$(15)"'";
Line 820 PRINT#4,CHR$(8)
Line 870 PRINT#4,CHR$(15):CLOSE4
```

4022 PRINTER

```
Line 685 CLOSE6:OPEN6,4,6:PRINT#6,CHR$(18)
Line 875 PRINT#6,CHR$(36):CLOSE6
```

Figure 1. Bit Mapping Procedure



```
30 PRINT"[CLEAR]"TAB(14)"[CMDR @12]
   "'CDAJ
40 PRINT TAB(10)"[SHFT *4,RVS]
    BIT BANNER [RVOFF,SHFT *4]"'CDML
50 PRINT TAB(10)"[DOWN]
   BY JERRY STURDIVANT"'CDXI
60 PRINT"[SPACE8,CMDR @26]"'BAPU
70 PRINT"[SPACE8].....................
   ......"'BATJ
80 PRINT"[SPACE10,CMDR +,SPACE23,
   CMDR +5]"'BAFL
90 PRINT"[SPACE9,CMDR +,SPACE3,CMDR +,
   SPACE2,CMDR +,SPACE3,CMDR +,SPACE5,
   CMDR +]"'BAFL
100 PRINT"[SPACE9,CMDR +,SPACE3,
    CMDR +,SPACE2,CMDR +,SPACE3,
    CMDR +,SPACE5,^]"'BAIB
110 PRINT"[SPACE9,CMDR +,SPACE25,
    CMDR +,SPACE44]SYMBOL"'BABG
120 PRINT"[SPACE9,CMDR +,SPACE3,
    CMDR +,SPACE2,CMDR +,SPACE3,
    CMDR +]"'BAJC
130 PRINT"[SPACE9,CMDR +,SPACE3,
    CMDR +,SPACE2,CMDR +,SPACE3,
    CMDR +] [CMDR @]"'BAAE
140 PRINT"[SPACE6,CMDR @,SPACE2,
    CMDR +,SPACE3,CMDR +] [CMDR +,
    SPACE25,CMDR @,BACK ARROW]
    HEIGHT (11 MAX)"'BAAL
150 PRINT"[SPACE6,CMDR @]
     ..........................."'BACG
160 PRINT"[SPACE6,^] [SHFT *24]"'BAOU
170 PRINT"MARGIN[SHFT K] [CMDR M,
    SPACE32,CMDR M2,BACK ARROW]
    SPACING"'BAFK
180 PRINT"[SPACE9,^]"'BAYF
190 PRINT"[SPACE6]COLUMN"'BATH
200 PRINT"[SPACE7]WIDTH[DOWN]"'BAPY
210 INPUT"SELECT HEIGHT";SH'BDAC
220 INPUT"SELECT COLUMN WIDTH";SW'BDAE
230 PRINT TAB(15)SW'CFQB
240 INPUT"[UP]SELECT SPACING";SS'BDIF
250 PRINT TAB(14)INT((80-SH*7)/2)'GNTH
260 INPUT"[UP]SELECT MARGIN";SM'BDFH
270 INPUT"SELECT SYMBOL";P$(1)'BGTI
280 PRINT"[CLEAR] 0[SPACE3]
    OF 255 CHARACTORS MAXIMUM"'BAPM
290 PRINT TAB(13)"[DOWN,CMDR @14]
    "'CDXP
300 PRINT TAB(6)"[SHFT *7,RVS]
     TYPE MESSAGE [RVOFF,SHFT *7]
    "'CCCN
310 PRINT"[DOWN,SPACE5]
    ALPHABET - NUMBERS AND
    ()*+-./"'BAMG
320 PRINT TAB(6)"[DOWN]
    'INST DEL' FOR CORRECTIONS"'CCGH
330 PRINT TAB(6)"[DOWN]
    SPACE BAR FOR PRINTING PAUSE"'CCJJ
340 PRINT TAB(15)"[DOWN,SHFT *10]
    "'CDBK
350 PRINT"[DOWN3,CMDR P]"'BAXD
360 D$="[DOWN13]":P$(0)=" ":N=1-pg 90
    :GOSUB 910'EPUJ
370 GET G$:IF G$=""THEN 370'EIVI
380 IF G$=CHR$(20)THEN 490'EJBJ
390 IF G$=CHR$(13)THEN 550'EJAK
400 K=ASC(G$):IF K<40 AND K<>32 OR
    K>90 OR K=44 OR L=255 THEN
    370'OAEN
410 IF LEN(M$(N))=38 THEN N=N+1
    :PRINT"[LEFT2] "'HNCH
420 M$(N)=M$(N)+G$:L=L+1'EQTG
430 PRINT"[HOME,SPACE4,HOME,RVS]"L;
    D$'BEND
440 FOR D=1 TO N'DDDE
450 PRINT'BACD
460 NEXT D'BBWE
470 PRINT M$(N)+"[CMDR P]"'CFDI
480 GOTO 370'BDJH
490 IF L=0 AND N=1 THEN 280'FHRL
500 M$(N)=LEFT$(M$(N),LEN(M$(N))-1)
    'EVXG
510 PRINT"[UP]"M$(N)+"[SPACE2]":L=L-1
    :IF L=0 THEN 280'HPJI
520 IF M$(N)=""THEN N=N-1'FIEG
530 IF N=0 THEN 410'DFVE
540 GOTO 430'BDGE
550 FOR I=1 TO N'DDIG
560 M$=M$+M$(I)'CJWI
570 NEXT I'BBCG
580 CLOSE 4:OPEN 4,4'CFOJ
590 FOR L=1 TO LEN(M$)'EGQL
600 N=(ASC(MID$(M$,L,1))-39)
    :N=N-((N=-7)*12)'JBPL
610 F$=MID$(A$,N*5-4,5)'EMEG
620 FOR J=0 TO 4'DDHE
630 B(J)=ASC(MID$(F$,J+1))'ENXI
640 B(J)=B(J)+(B(J)>96)*96+(B(J)<96)
    *32+((B(J)=255)*33)'KQTT
650 NEXT J'BBDF
660 FOR C=0 TO 4'DDAI
670 FOR R=6 TO 0 STEP-1'FEUL
680 L(C,R)=INT(B(C)/2^R)'EOCN
```

```
690 B(C)=B(C)-L(C,R)*2^R'EQSP
700 NEXT R,C'BDQC
710 PRINT#4'BBDC
720 FOR C=0 TO 4'DDAF
730 FOR W=1 TO SW'DEJH
740 FOR M=1 TO SM'DETH
750 PRINT#4," ";'BDHH
760 NEXT M'BBGH
770 FOR R=0 TO 6'DDRK
780 FOR H=1 TO SH'DEJL
790 PRINT#4,P$(L(C,R));'BNKN
800 NEXT H'BBBC
810 GET Z$:IF Z$=""THEN 830'EIKH
820 GET Z$:IF Z$=""THEN 820'EIJI
830 NEXT R'BBLF
840 PRINT#4'BBDG
850 NEXT W,C'BDVI
860 FOR S=1 TO SS'DEBL
870 PRINT#4'BBDJ
880 NEXT S,L'BDBL
890 CLOSE 4'BBLL
900 END'BACD
910 A$="[SPACE2]<B[CMDR K,SPACE2,
    CMDR K]B<J<[CMDR *]<J(([^]((
    [SPACE5](((((  %#"'BCMM
915 A$=A$+"[SPACE2]#$(0[SHFT *,^,
    CMDR G,SHFT POUND,CMDR E,^] A
    [CMDR *]! C[CMDR G2,SHFT POUND]QB
    [CMDR K,SHFT POUND2]V,4D[CMDR *]
    $"'CENX
920 A$=A$+"[SHFT R,CMDR E3,CMDR V]>I
    [SHFT POUND2,CMDR S]@[CMDR M,
    CMDR POUND,CMDR A,SHFT *]V
    [SHFT POUND3]VQ[SHFT POUND2,
    CMDR N,POUND,SPACE2]H[SPACE3]
    !F"'CEKX
925 A$=A$+"[SPACE2](4B[CMDR K2]44444
    [CMDR K2]B4(@[SHFT SPACE,CMDR G,
    CMDR POUND]P[^,CMDR K,CMDR X,
    CMDR J]][BACK ARROW,CMDR POUND3,
    BACK ARROW]"'CEWA
930 A$=A$+"[CMDR K,CMDR *,SHFT POUND2]
    V[^,CMDR K3]B[CMDR K,CMDR *,
    CMDR K2,^,CMDR *,SHFT POUND3,
    CMDR K,CMDR *,CMDR POUND3,
    SHFT SPACE,^,CMDR K2,SHFT POUND,
    CMDR S,CMDR *](((([CMDR *] [CMDR K,
    CMDR *,CMDR K] "'CEAG
935 A$=A$+CHR$(34)+"![CMDR K,SHFT ^,
    SHFT SPACE,CMDR *](4B[CMDR K]
    "'EIOT
940 A$=A$+"[CMDR *]!!!![CMDR *]@8@
    [CMDR *2]0($[CMDR *,^,CMDR K3,^,
    CMDR *,CMDR POUND3]P[^,CMDR K,
    CMDR G,CMDR I]][CMDR *,CMDR POUND,
    CMDR D,CMDR N]QR[SHFT POUND3]F
    [SHFT SPACE2,CMDR *,SHFT SPACE2,
    SHFT ^]!!![SHFT ^,SHFT P],#,
    [SHFT P,CMDR *]"'CEJN
950 A$=A$+CHR$(34)+","+CHR$(34)+"
    [CMDR *,SHFT C]4(4[SHFT C,SHFT P]
    (/([SHFT P,CMDR T,CMDR G,
    SHFT POUND,CMDR E,SHFT A]"'HMNX
960 RETURN'BAQJ
```

If you don't want to bother typing in all the graphic commands at the end of the preceding listing, make these changes in the program. First, change line 360, as shown below. Then delete lines 910-960 and type in the additions and corrections shown below.

```
360 D$="[DOWN13]":P$(0)=" ":GOSUB 910
    :N=1'EPUJ
```

```
910 FOR I=1 TO 255'DFLG
920 READ N:A$=A$+CHR$(N):T=T+N'GNNM
930 NEXT I'BBCG
940 IF T-13213 THEN PRINT"BAD DATA"
    :END'FHIN
950 RETURN'BAQI
960 DATA 0,0,28,34,65,0,0,65,34,28,42,
    28,127,28,42,8,8,62,8,8,0,0,0,0,
    0'BMBV
970 DATA 8,8,8,8,8,0,3,3,0,0,3,4,8,16,
    96,62,69,73,81,62,0,33,127,1,
    0'BJAV
980 DATA 35,69,69,73,49,34,65,73,73,
    54,12,20,36,127,4,114,81,81,81,
    94'BKTX
990 DATA 30,41,73,73,78,32,71,72,80,
    96,54,73,73,73,54,49'BWVV
995 DATA 73,73,74,60,0,0,40,0,0'BWVV
1000 DATA 0,1,38,0,0,8,20,34,65,65,20,
     20,20,20,20'BOPA
1005 DATA 65,65,34,20,8,32,64,69,72,
     48'BDXD
1010 DATA 62,65,93,85,61,63,72,72,72,
     63,65,127,73,73,54,62,65,65,65,
     34'BKGG
1020 DATA 65,127,65,65,62,127,73,73,
     73,65,127,72,72,72,64,62,65,65,
     73,78'BMMH
1030 DATA 127,8,8,8,127,0,65,127,65,0,
     2,1,65,126,64,127,8,20,34,65'BGXH
1040 DATA 127,1,1,1,1,127,32,24,32,
     127,127,16,8,4,127,62,65,65,65,
     62'BIKI
1050 DATA 127,72,72,72,48,62,65,69,66,
     61,127,72,76,74,49,50,73,73,73,
     38'BLOK
1060 DATA 64,64,127,64,64,126,1,1,1,
     126,112,12,3,12,112,127,2,12,2,
     127'BKIK
1070 DATA 99,20,8,20,99,112,8,15,8,
     112,67,69,73,81,97'BSGI
```

BY C. W. DE LAUGHTER

Color Scheme for the Commodore 64

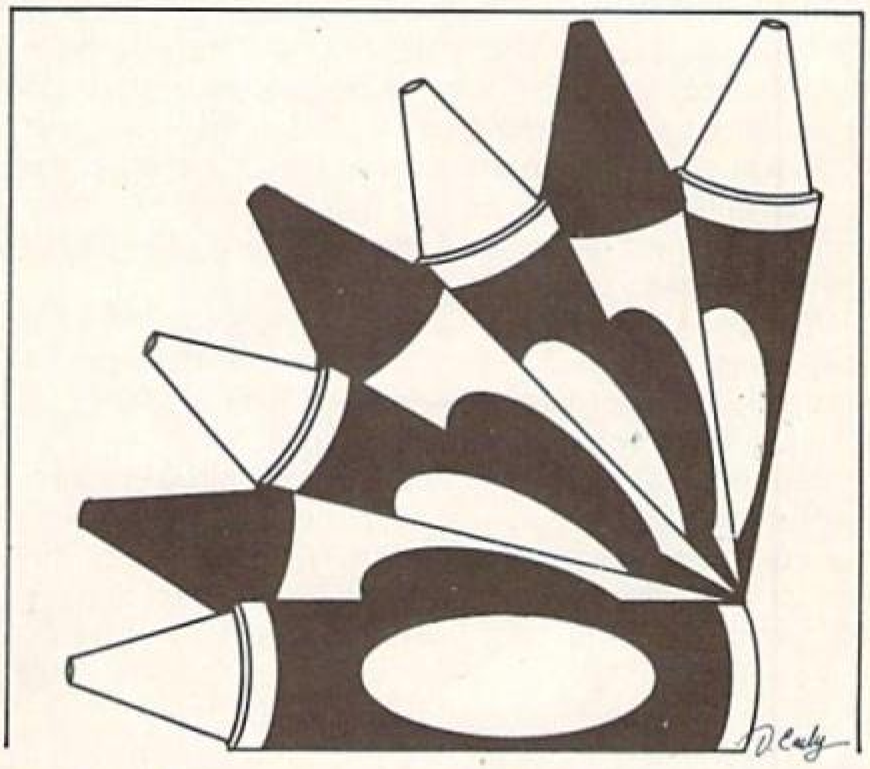
It happens to you. Admit it. You turn on your Commodore 64, open the user's guide, and poke in a series of code. This code is needed to change your text and background colors from light blue characters on a dark blue background to whatever suits you. A few minutes into your programming session you find that you must key RUN/STOP RESTORE. Instantly, you are back to the original color scheme. Frustrating, right?

This short program, "Color Scheme", will end those frustrations. When run, it will replace the standard screen colors with those found on the VIC 20 and the SX 64, the portable version of the Commodore 64. Your screen will then display dark blue characters on a white background with a cyan border. The real good news is that you can then key RUN/STOP RESTORE endlessly and the new colors will return each time.

In my mind I can hear a reader say, "So who wants blue on white? My tastes are more esoteric. I prefer yellow characters on an all purple screen." No problem. Just change one value per line in line numbers 160, 170 and 180. In line 160 change the 3 to 4, in line 170 change the 1 to 4, and in line 180 change the 6 to 7. These changes modify the border, background and character color, respectively. Wow! Yellow on purple. I just tested that combination and can report that after you get used to these colors, they still look awful. Anyway, by using the color number chart on page 61 of the user's guide, you can modify "Color Scheme" for any combination you choose.

The machine language heart of this program is written in a relatively safe area of memory. If you run BASIC programs, this program should remain operative until you turn off your computer. Certain machine language programs, however, may occupy the same memory locations. If "Color Scheme" should seem to disappear, just reload the program and run it again.

By using the color number chart on page 61 of the user's guide, you can modify "Color Scheme" for any combination you choose.



This program is one more step in putting *you* in control of your computer. Modify it to your special preference. Happy computing.

```
PROGRAM:  COLOR SCHEME.CS

 100 REM   ************************'BXJY
 105 REM   ***  COLOR   SCHEME  ***'BRPE
 110 REM   ***                  ***'BGNW
 115 REM   ***       BY         ***'BIMD
 120 REM   *** C.W. DELAUGHTER ***'BUBC
 125 REM   ************************'BXJG
 130 REM'BARX
 135 X = 50000'BGEE
 140 FOR I = X TO X +17:READ Y'FHBD
 145 POKE I,Y:NEXT I'CFFG
 150 POKE 770,80:POKE 771,195'COEE
 155 SYS 65126'BFLG
 160 DATA 169,3: REM BORDER COLOR'CRKG
 165 DATA 141,32,208'BKLI
 170 DATA 169,1: REM SCREEN COLOR'CRKH
 175 DATA 141,33,208'BKMJ
 180 DATA 169,6: REM CURSOR COLOR'CRUI
 185 DATA 141,134,2'BJIK
 190 DATA 76,131,164'BKTG
```

```
PROGRAM:  COLOR SCHEME2.CS

 100 REM   ************************'BXJY
 105 REM   ***  COLOR   SCHEME  ***'BRPE
 110 REM   ***                  ***'BGNW
 115 REM   ***       BY         ***'BIMD
 120 REM   *** C.W. DELAUGHTER ***'BUBC
 125 REM   ************************'BXJG
 130 REM'BARX
 135 X = 50000'BGEE
 140 FOR I = X TO X +17:READ Y'FHBD
 145 POKE I,Y:NEXT I'CFFG
 150 POKE 770,80:POKE 771,195'COEE
 155 SYS 65126'BFLG
 160 DATA 169,3: REM BORDER COLOR'CRKG
 165 DATA 141,32,208'BKLI
 170 DATA 169,1: REM SCREEN COLOR'CRKH
 175 DATA 141,33,208'BKMJ
 180 DATA 169,6: REM CURSOR COLOR'CRUI
 185 DATA 141,134,2'BJIK
 190 DATA 76,131,164'BKTG
```

April Fools SPECIAL

BY FERDINAND MAXIMILIAN III

Disk Enlarger

When I first bought my Commodore 64, 1525 printer and 1541 disk drive, I was happy as a mosquito in a nudist camp. But as I started writing programs and saving them, and typing in programs from magazines and saving them, I realized I was filling up a lot of disks! I had about 135 disks full of programs, data files and other stuff. This was getting a little out of hand, not to mention expen$ive. I knew there had to be a better way.

If you look at a floppy disk through an electron microscope, you will notice that many of the grains of metal oxide on the disk are being wasted! Over the surface of the whole disk I found that there were an average of seven grains being wasted for every ten that were used. This meant that if I could find a way to get the disk drive to use all of the grains on the disk, I could store over three times the amount of data on each disk (2240 blocks per disk!).

Well, I worked and worked at it, and I finally found a way of not only using every grain on the disk, but of compressing that data as well. The result is that I can save ten disks worth of data on one disk.

Here is the program that does it. Type in the program and use SYS49152 to activate it. Be careful that all your data is correct before you use the SYS command or the resultant magnetic field in the disk drive could destroy the picture tube in your television (this is a powerful program!). C

```
10 PRINT"[CLEAR]POKING -->";'BBPA
20 P=49152'BGHA
30 READ A$:IF A$="END"THEN 100'EIRD
40 L=ASC(MID$(A$,2,1))'DLEE
50 H=ASC(MID$(A$,1,1))'DLYF
60 L=L-48:IF L>9 THEN L=L-7'HKVJ
70 H=H-48:IF H>9 THEN H=H-7'HKBK
80 PRINT"[HOME,RIGHT12]"P;'BCVG
90 B=H*16+L:POKE P,B:T=T+B:P=P+1
   :GOTO 30'JUYP
100 IF T<>14352 THEN PRINT"MISTAKE IN
    DATA --> RECHECK YOUR DATA LINES"
    :END'GHLL
110 PRINT"DONE":END'CBYX
1000 DATA A5,9D,C9,80,F0,19,08,C0'BXWX
1001 DATA F7,81,81,81,75,75,75,F4'BXTY
1002 DATA 84,76,A5,B4,B6,AD,B0,84'BXLA
1003 DATA AA,B3,B3,B0,B7,85,F6,A0'BXDB
1004 DATA 00,B9,08,C0,38,E9,64,20'BXIC
1005 DATA D2,FF,C8,C0,17,D0,F2,B9'BXRD
1006 DATA 08,C0,D0,0A,88,84,AD,B9'BXHE
1007 DATA 08,C0,85,B4,F0,CA,A9,00'BXWF
1008 DATA 85,FB,A2,00,A0,00,8E,20'BXVG
1009 DATA D0,8C,21,D0,E6,FB,D0,F9'BXOH
1010 DATA C8,D0,F6,E8,E0,10,D0,EC'BXMY
1011 DATA 8C,20,D0,8C,21,D0,60,
     END'BYAA
```

BY JIM OLEOFIELD

Oleofield

Many people will look at ads to determine the company or city in the U.S. that will sell them a Commodore 64 at the lowest cost. But is this the most important selling point of a computer? Of course not. The real seller of any computer is the enjoyment that can be derived from its use. So people should try to buy the Commodore 64 from the place that will result in the greatest enjoyment.

Before I became an engineer, I was a statistician with a major firm outside Thunder Bay, Ontario. It was during this work that I learned many fascinating geo-economic theories. When I switched to engineering I found that many of these theories could be applied to the field of computers.

Through my own research, I have found that there is a direct relationship between the enjoyment potential of a computer and its cost-foot per person of the city it was purchased in. Expressed as "$ft/pop," this index has been one of my most popular tidbits to date. The lower this number is, the more fun the computer will be.

Here is a chart of the $ft/pop for the Commodore 64 in 13 of the most popular cities in the U.S.:

City, State	Population (1980)	Altitude (feet)	$ft/pop
Peoria, IL	124160	470	.64
Provo, UT	73907	4550	10.40
Holyoke, MA	44678	115	.43
Lima, OH	47381	865	3.08
Biloxi, MS	49311	20	.07
Eau Claire, WI	51504	790	2.59
Gadsden, AL	47565	555	1.97
Joplin, MO	38893	990	4.30
Shreveport, LA	205815	204	.17
Lubbock, TX	173979	3195	3.10
Piere, SD	11973	1480	20.89
Dodge City, KS	18001	2480	23.28
Flagstaff, AZ	34641	6900	33.66

Using this table, it is easy to see why I always buy all my computer equipment in Biloxi, Mississippi. C

BY STEPHEN S. LEVEN

Text Line Processor

for Commodore 64 and VIC 20

My neighbor Aaron came over the other night. Before he was barely through the door, he shouted, "Hey Steve! I hear you got a new computer!"

Yes, I had just bought a Commodore 64. I had had a VIC 20 for some time, and Aaron had already used it many times playing games with my son, Jonathan. I also have the Commodore datasette, a 1525 printer, 1541 printer and a 1541 disk drive. But now that I had a 64, my array of computer equipment took on a whole new appearance to him.

Aaron looked at the 64, then at the printer, then at me. "Can I type on the keyboard and have it print on the printer?" I had to stop and think for a moment. How was I going to explain to this 14 year-old that the 64 could not simply be transformed into a typewriter? But suddenly I had an idea. I would program the 64 to do just what he requested!

Easier Said Than Done

My first idea was to simply use the OPEN and CMD statement to force the normal computer output to the printer instead of to the TV screen. I typed, in direct mode (without line numbers) on the 64:

```
OPEN 1,4    <RETURN>
CMD1      <RETURN>
```

(*Note:* All commands and program lines work equally well on the VIC 20 with or without expansion memory.)

The printer responded with "READY." Hurray! I was in business, or so I thought. I'd show Aaron how really simple it was to make the computer do what I wanted!

I typed his name: AARON HENDERSON. The letters showed on the TV screen, but not on the printer. I was starting to worry a little. Then I tried pressing RETURN. The printer made some noise, but didn't print anything. As I was busy staring at the printer and scratching my head, Aaron was reading the TV screen. "Gee, that's neat! But what does ?SYNTAX ERROR mean?"

> *To illustrate how to create a computer program from concept to completion, let's trace the development of a super-mini word processor. For the Commodore 64 and VIC 20 with any amount of memory, and the Commodore 1525 printer.*

LINEWRITER 64

Back to BASICs

Using the OPEN and CMD statements causes the computer to direct its output to the specified channel. In this example, we opened channel one to the printer (device 4). CMD1 directs the computer to output to channel one instead of the TV screen. However, typing AARON HENDERSON <RETURN> confused the computer, and the error routine cancelled the CMD command, causing the error message to be displayed on the TV screen.

I could have told Aaron to enclose everything he wanted to print in quotation marks, and precede the whole phrase with the word PRINT or its abbreviation the question mark, but I realized that Aaron wanted a typewriter. He wanted to type on the keyboard, and see the result printed on the printer. So I wrote a short BASIC program to take what he typed as input, and then, when he finished typing a line (indicated by pressing RETURN), to output that data to the printer. I started with the bare essentials of the program:

1. Prompt the user for data.
2. Accept the data.
3. Set up a data channel for the printer.
4. Output the data to the printer.
5. Close the printer data channel.
6. Go back to step one for the next line of data.

The resulting program lines, which work on either the Commodore 64 or the VIC 20 with any amount of memory, look like this:

See Line Writer Program Page 96

It is not necessary for you to type in the ": REM ... " portions of the lines. They are there only for explanation of the program. It is also not necessary to type any of the spaces shown between the portions of the program lines. They are simply for clarity. It is important NOT to leave any spaces between the quote marks in lines 12 and 20. The program will not work properly if you do. After typing the program into your computer, save it before you run it, just in case there are any mistakes that would cause the computer to crash.

This seemed simple enough. Let me explain a few of the concepts. The GET statement, rather than the INPUT statement, was selected for inputting data since a comma or colon in the text line would confuse the INPUT statement into thinking that there was no more data in that line. We GET a character, A$ (line 20), and add it to the end of the text line, B$ (line 27), which had been cleared when we started typing the sentence (line 12). The RETURN key signals the end of the data input, indicating that the printer should begin printing.

The PRINT A$; in line 29 causes the character received in the GET statement (line 20) to be printed on the screen. The semicolon is important because it means that one character will be printed immediately after the preceding one. The PRINT statement in line 40 causes the next item printed to the screen ("TYPE:") to be displayed at the beginning of the next line. Try leaving out the semicolon in line 29 or the ": PRINT" in line 40 and see what happens when you run the program.

We open and close the printer data channel at every printing so that when the program is ended (by hitting the RUN/STOP key), we will not be left with an open file. If we didn't care about this problem, we could add the OPEN statement at the beginning of the program, say as line 10, and eliminate the CLOSE1 statement in line 50.

To start the program, type RUN <RETURN>. The word "TYPE*" should be displayed on the screen, with no cursor showing. Simply begin typing your text, and it will be displayed on the screen on the next line.

The DELETE key

I tried the program and it worked. Then Aaron sat down at the keyboard and tried his hand. But Aaron is not too used to typing, and he had trouble typing his name. He started out:

AARON HENDERS9

"Uh-oh! I made a mistake. What should I do now?"

"Just hit the DELETE key," I told him with confidence. So he did, and magically the erroneous nine disappeared. He finished typing his name. The actual total keystrokes he used were the following:

AARON <SPACE> HENDERS9 <DELETE> ON <RETURN>

When he pressed the RETURN key, the printer dutifully began printing what he had typed:

AARON HENDERS9ON

I anticipated the questions even before the words left his lips. "How come the nine is still there? I thought it went away when I pressed DELETE."

This one took a little more thinking. Finally I realized that, as usual, the obedient 64 was doing exactly what I had told it to do. After displaying the nine on the screen, it printed the next character, which was a DELETE, thereby deleting the nine from the screen. But in the string B$, the DELETE character was just added to the string after the nine. When it came time to print, the printer printed the nine, but couldn't print a DELETE character, so it just continued with the next character in the string, the 0. The nine was still in B$, so it printed.

To solve this problem, we would have to actually remove a character from B$ every time the DELETE key was struck. This is done by looking at the length of B$, then resetting B$ to the left most characters of B$, except for the last character, which is to be deleted. The following program line takes care of this:

(If the program is still running, hold down RUN/STOP and press RESTORE to stop the program and get back to the flashing block cursor.)

```
26 IF A$=CHR$(20)
   THEN B$=LEFT$(B$,
   LEN(B$)-1):GOTO 29
```

We typed RUN <RETURN> and tried this change with the same example that tripped us up originally. We typed:

AARON <SPACE> HENDERS9 <DELETE> ON <RETURN> and the printer responded:

AARON HENDERSON

"We did it!" shouted Aaron, taking partial credit for *my* programming prowess. I didn't mind, though, since if he hadn't made the "simple" request to use the printer, I wouldn't have had all this fun! The TV screen was displaying the prompt "TYPE:", waiting for Aaron to input his next sentence. "Now the DELETE key works," he said as he pressed it. Our smiles turned to frowns as we saw the error message on the screen:

?ILLEGAL QUANTITY ERROR IN 26

"Now what?" he said with some evidence that he was getting tired of the whole affair. I looked at line 26, and the only quantity which could possibly be illegal was the string length used in the "LEFT$(... " expression.

In direct mode, I typed: PRINT LEN(B$)-1 <RETURN>, to which the 64 responded: "-1". Aha! That was my illegal quantity. The length for the LEFT$ (and RIGHT$) statement is limited to between zero and 255. At the beginning of our text line, when B$ is empty, the length of B$ is zero. Typing the DELETE key caused line 26 to try to subtract one from the length of B$. We needed to add one more line to prohibit such a crash if the DELETE key, which is CHR$(20), is pressed when B$ is empty:

```
25 IF B$=""AND
   A$=CHR$(20)THEN 20
```

We tested out this change by typing RUN <RETURN> and then hitting DELETE, and found that it worked—no more error message. Aaron went on to type several sentences, all of which printed out properly. *Next issue Steve modifies his program to make it easier to use. Programming is after all, a creative process.* ■

```
PROGRAM:  LINE WRITER.CS
12 PRINT"TYPE:":B$="": REM B$ STRING
   IS CLEARED'DVDH
20 GET A$:IF A$=""THEN 20
   : REM GET ONE TYPED CHARACTER'FDLI
22 IF A$=CHR$(13)THEN 30
   : REM THE <RETURN> KEY'FXVJ
27 B$=B$+A$: REM ADD A$ TO END OF B$
   STRING'DCHN
29 PRINT A$;:GOTO 20: REM GET NEXT
   CHARACTER'DXKO
30 OPEN 1,4: REM DATA CHANNEL FOR
   PRINTER'CAXH
40 PRINT#1,B$:PRINT: REM PRINT DATA,
    GO TO NEXT LINE'DDFJ
50 CLOSE 1: REM CLOSE DATA
   CHANNEL'CSJH
60 GOTO 12: REM GO BACK TO STEP 1'CQHH
```

Sky Travel Challenge

There is buried gold in Commodore's astronomy program, *Sky Travel*. Hidden in the program are 11 map tokens that can be discovered only by standing at the right place, in the right year and looking in the right direction. For instance, if you were exactly at the longitude and latitude of Washington, D.C., you would expect to see the Washington Monument somewhere on the horizon. But you wouldn't expect to see it there if the date were 1492 A.D.

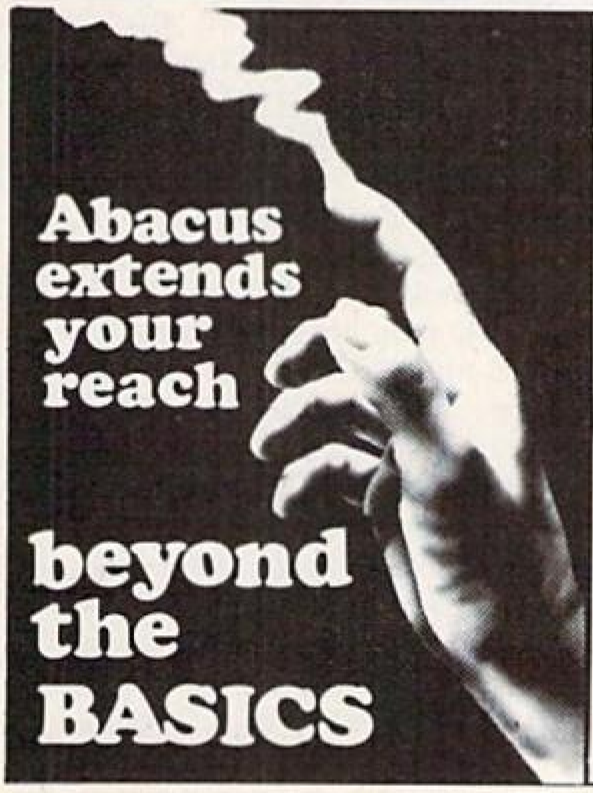
In the March/April issue of our sister magazine, *Commodore Microcomputers*, we challenged our readers to find these tokens (sorry, the Washington Monument is not one of them) and gave them a set of clues to start them off. Since the first set of clues is pretty difficult and we didn't expect anyone to get them all, we are offering both the first and second set of clues in this issue of *Commodore Power/Play*. The final set of clues and the answers will appear in the May/June *Commodore Microcomputers*.

First of all, there is a bear somewhere in *Sky Travel* (it appears as if by magic on one of the demo screens that you may have seen at your computer store). All the clues have the bear as a central theme, so you don't know which clue refers to the real bear. Also not all information in a clue may be pertinent. Good luck.

CLUES

1. An alert person should have no trouble finding the bear.
1a. The "Alert" person likely resides in an igloo.
2. Stated empirically, if the bear really exists, he gets top billing.
2a. When bear reaches top billing, he detects the odor of gorilla.
3. See an angry bear, not one but two, on tour, climb high, higher, highest with no visible means of support.
3a. Away it gives "two on tour."
4. Hungry bear, but a half-wit, looks for hamburgers, is disappointed, but we're not, are we?
4a. The bear sees half of a familiar looking landmark in the distance.
5. Guilty bear is fugitive, is chased by Canadian police force.
5a. The bear may be in Canada, but the "Mountie" is not.
6. How do you expect to find the bear if you are looking for a mosque?
6a. Look for a mosque—how would you do that?
7. Don't cross this one off, because, although suspenseful, you have to wait until the bear comes to it.
7a. Bear finds gold by figuring out what it is that he shouldn't cross before coming to it.
8. Betsy says, "Jim, go in and get my pen, and don't worry about the bear."
8a. Betsy is THE Betsy. Her husband has been knighted.
9. Bear goes 200 steps north, 200 steps east, 200 steps south, and 200 steps west. What color is the bear?
9a. Bear would be better off if he were a camel.
10. Bear has party, gets plastered in style.
10a. Plaster is dehydrated calcium sulfate.
11. The bear may be gentle, but he's still pretty big, so watch out!
11a. Green witch casts spell on bear by saying bong, bong!

While you tear your hair out trying to solve these, we hope that you will learn some geography and astronomy. Good luck! ◼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BY IAN ADAM

A Graphing Simulator for the Commodore 64 and VIC 20

Have you ever just sat and looked at all those unusual graphics characters on the keyboard of your VIC 20 or Commodore 64? Perhaps you've doodled with them, using the characters to create simple graphics displays. Actually, the keyboard graphics are very useful, and can be applied to a wide variety of tasks. Their greatest advantage is ease of use—simply press a key while holding down the SHIFT or Commodore logo key, and presto, instant graphics! While you could certainly obtain the same results using high-resolution graphics, the process would be much slower and more complicated. On other well known brands of computers, you must define each graphic character, pixel by pixel. How convenient to have them available directly.

I would like to show how incredibly easy it is to use these graphics characters to generate bar graphs for just about any application—home, business, clubs or whatever. Second, with that out of the way, I'll provide a lighthearted demonstration program to show how it's done.

But Seriously...

Although the two versions of the demonstration program are designed primarily for amusement, they do serve to illustrate a couple of very simple ways of constructing bar charts. The actual plotting is carried out in the subroutine from line 1000 to 1040. The built-in graphics characters are tailor-made for drawing charts. (You don't suppose Commodore planned it that way??) All you have to do is set up a FOR-NEXT loop equivalent to the length of the bar that you want. Using the loop, simply POKE or PRINT the desired symbol repeatedly to create the bar.

> *This program won't actually balance your budget, nor prepare your income tax return. In fact, it serves no serious purpose at all! Type it in, then find out for yourself exactly what it really does.*

Either the POKE or the PRINT command will work to draw a bar graph. For illustrative purposes, the 64 version of the program uses POKE, because it gives greater control over the symbols used, and because the 64's screen memory always stays in the same place. The VIC 20 version uses PRINT, which needs less calculating in advance and is easier to place anywhere on the screen that you want.

A little more care is required with PRINT, however, since certain characters don't produce a bar at all, but have other undesirable side effects instead. For example, CHR$(147) will clear the screen, while others will change colors or move the cursor. Be careful to avoid specifying these characters when printing a bar.

When you use either command, the best effect is achieved by using reversed characters. With the PRINT version, this is achieved by printing CHR$(18) first, while the POKE version uses values greater than 127.

With slight modification you can use either program in your VIC 20 or 64. In both cases, the serious business occurs in the subroutine beginning at line 1000. Either version of this routine can be lifted out and inserted as-is in any other program that requires plotting a bar chart function. (If you use the POKE version, you must define the variables X1 and X2 at the start of your program. These represent the starting locations of color memory and screen memory for the line you want to plot on.)

Then, all you have to do is specify the length, color and character of the bar, using these variables:

LE Length of bar.
C Color to be used to create the bar.
CH Character to be used to create the bar.

CH can be just about any graphics character you choose, or it could even be an alphanumeric symbol. Unique custom graphics can be generated by using a character matched to the parameter being plotted. For example, use $ or £ for cost plots, or % to track progress in school grades. (Or use π for bakery output!!) Again, plots are most effective if the characters are reversed.

These are some of the best multi-purpose characters:

Effect	*POKE value:*	*PRINT value:*
Solid bar:	CH = 160	CH = 32
Cost Graph:	CH = 164 ($) 156 (£)	CH = 36 92
Chevrons:	CH = 190	CH = 62
Broken bar:	CH = 194	CH = 98
Bar of X's:	CH = 214	CH = 118
Bar of O's:	CH = 215	CH = 119
Diamonds:	CH = 218	CH = 122
Checkered:	CH = 230	CH = 166

When everything is set up the way you want, just GOSUB 1000 to plot each bar. What could be simpler?

The Fun

Sometimes we tend to take our home computers very seriously. You know—all that talk about how a computer will organize your life or help your family produce the next Einstein. And the truth is that if you can dig underneath some of the advertising hype, there is a wide variety of excellent programs available for your VIC 20 or Commodore 64. These will play games, help educate the kids, even do everything on your income tax return short of signing the check.

Well...this program is different.

I could tell you that this program offers a dynamic simulation of financial analysis procedures. I could also tell you that it takes full advantage of the graphics and sound capabilities of your computer. Perhaps you've noticed that, so far at least, the description sounds a lot like several of the other analytical/financial packages that are advertised for your computer.

However, before you get too far in this exercise, please read the fine print.

The Fine Print

Unfortunately, this program won't actually balance your budget, nor prepare your income tax return. In fact, it serves no serious purpose at all! Don't worry, though...it's all in good fun. The program is short enough, so I won't tell you all the details about what it does do. Instead, you'll just have to type it in, then you can find out for yourself exactly what it really does. I'll wait while you're typing; it won't take long. I hope that you'll find the program to be entertaining when you run it.

64 Graph

```
1 REM GRAPHIC ANALYSIS SIMULATION
  C64'BDMH
2 :'ABHA
3 REM BY IAN ADAM'BJVE
6 :'ABHE
7 REM CAUTION: RUN THIS PROGRAM AT
  YOUR OWN RISK!!'BMPQ
8 :'ABHG
10 REM SET SOUND CHIP:'BNWB
20 X=54273:Y=X+3'DKLC
30 POKE Y+1,25:POKE Y+2,31'ELSD
40 POKE Y+20,15'CGQC
50 :'ABHB
60 REM GET SCREEN READY:'BPVG
70 PRINT"[CLEAR,L. BLUE,DOWN23]"'BADG
80 POKE 53280,3:POKE 53281,1'CPPI
90 X1=56260:X2=1988'COQJ
100 :'ABHU
110 REM SETUP'BFGX
120 I=RND(-TI)'DFDA
130 DEF FN A(N)=INT(RND(I)*N)'GKIE
140 FOR I=1 TO 26'DEJB
150 IF FN A(70)<1 THEN A=-32'GJHF
160 :'ABHB
170 REM LE IS LENGTH OF BAR IN
    GRAPH'BWPI
180 LE=FN A(18)+FN A(18)+1'FNIJ
190 IF A<0 THEN A=A+1:LE=FN
    A(7)+1'INRM
200 PRINT CHR$(I+64)LE;'DIRY
210 POKE X,LE+1'CFJY
220 POKE Y,33'BEEY
230 :'ABHY
240 REM C IS COLOUR OF BAR'BOVE
250 C=FN A(15):IF C=1 THEN 250'FMLG
260 :'ABHC
270 REM CH IS REVERSE CHARACTER TO BE
    PLOTTED'BGOM
280 CH=FN A(129)+127'DLII
290 :'ABHF
300 REM PLOT BAR'BHMY
310 GOSUB 1000'BECY
320 POKE Y,32'BEDA
330 NEXT'BAEA
340 GOTO 140'BDEC
940 :'ABHH
950 BAR CHART SUBROUTINE:'ATTN
960 : LE = LEN GTH OF BAR'CLPN
970 : C  = COLOUR OF BAR'BNIO
980 : CH = CHARACTER TO PLOT'CQFQ
990 :'ABHM
1000 FOR B=1 TO LE'DESU
1010 POKE X1+B,C'CFWV
1020 POKE X2+B,CH'CGUW
1030 NEXT'BAEV
1040 PRINT:RETURN'CBVX
```

VIC Graph

```
1 REM GRAPHIC ANALYSIS SIMULATION VIC
  20
2 :
3 REM BY IAN ADAM
6 :
7 REM CAUTION: RUN THIS PROGRAM AT
  YOUR OWN RISK!!
8 :
10 REM SET SOUND CHIP:
20 X=36875
30 POKE X+3,15
50 :
60 REM GET SCREEN READY:
70 PRINT"[CLEAR,DOWN22]"
80 POKE X+4,27
100 :
110 REM SETUP
120 I=RND(-TI)
130 DEF FN A(N)=INT(RND(I)*N)
140 FOR I=1 TO 26
150 IF FN A(70)<1 THEN A=-32
160 :
170 REM LE IS LENGTH OF BAR IN GRAPH
180 LE=FN A(9)+FN A(8)+1
190 IF A<0 THEN A=A+1:LE=FN A(6)+1
200 PRINT CHR$(31)CHR$(I+64)LE;
210 POKE X,3*LE+200
230 :
240 REM C IS COLOUR OF BAR
250 C=FN A(8):IF C=1 THEN 250
260 :
270 REM CH IS CHARACTER TO BE PLOTTED
280 CH=FN A(96)+32
290 :
300 REM PLOT BAR
310 GOSUB 1000
320 POKE X,0
330 NEXT
340 GOTO 140
940 :
950 BAR CHART SUBROUTINE:
960 : LE = LEN GTH OF BAR
970 : C  = COLOUR OF BAR
980 : CH = CHARACTER TO PLOT
990 :
1000 POKE 646,C:PRINT TAB(5)CHR$(18);
1010 FOR B=1 TO LE
1020 PRINT CHR$(CH);
1030 NEXT
1040 PRINT:RETURN
```

COMPUTER TUTOR

BY LOU HINSHAW

Build Your Own Computer Control System

You can use your Commodore 64 and VIC 20 for more things than you may realize—much more than playing games and balancing checkbooks. You can even do more than write an article like this, which was done on a VIC 20. A VIC 20 or 64 can watch for burglars, guard the dog, mow and water the lawn, run a factory or machine shop, control a robot and cook breakfast. I have designed systems for the VIC 20 to do many of these things, so I know. In this article I'd like to direct you to some sources that can teach you to design and build a computer control system.

First, you should know that it is possible to plug in expansions to the VIC that will raise its memory to 320 kilobytes. That means nearly two full disks worth of memory accessible at electronic speeds. Select-A-Ram, by Advanced Processor Systems, does this. Other products of the same kind are available. A small native memory is not a bar to using the VIC.

However, the cost of such memory expansion and also of commercial peripheral controllers might seem to be an impediment. Several items came on the market, but they cost more than they were worth to the buyer. The prices have come way down, but even so, prices are still out of reach for many users. You can bypass this problem, though, by making the stuff yourself. Or you can buy small modules, make them do small jobs, and add to the system as you can afford to.

The *Commodore 64 Interfacing Blue Book* and *VIC 20 Interfacing Blue Book* by V.J. Georgiou (Microsignal Press) are a pair of "must" books for the tinkerer, the tailorer and the small machine builder. The casual tinkerer will find simple projects that are easy to understand and build. The consultant who designs tailored uses for small computers will be delighted by the value of the projects as building blocks and for ideas. The small firm that builds or repairs machines can use the *Commodore 64 Interfacing Blue Book* and *VIC 20 Interfacing Blue Book* as sensor and control references that permit you to automate a small machine shop or factory.

> *Using these resources, you can build a computer control system to run your household appliances or automate a small factory.*

Both books are in simple, easy-to-read language suitable for junior-high users who want something solid for science fair projects. If you can use a soldering iron and read a schematic or get someone to teach you, you can build most of the projects.

The *Commodore 64 Interfacing Blue Book* can pay for itself with just the project to double the RAM available to the 64. The *VIC 20 Interfacing Blue Book* has a similar project to increase VIC memory to 128K.

Both books have similar projects, like the "user port breadboard," which is obviously the same project with "VIC" scratched out and "64" pencilled in. But there are enough unique projects in each book to justify owning both if you own both machines. The software is different for each machine. The books are worth getting just to see how control modules and other add-ons are programmed.

I did, however, have trouble with the program in the VIC capacitor tester project, although I have not yet found any errors in the 64 programming. Since the capacitor tester is the only VIC software I have used so far, it's hard to say if this is a problem throughout. I built a VIC memory board, and it and the capacitor tester *hardware* worked quite well.

The software used in the books is simple enough to be used in a larger system. This simplicity also makes it easy to debug. The programs are not explained as well as I could wish, but there are hints enough for any but the most naive novice.

There are also other sources available to help you design controller projects, including things like starter (switch) hardware. One such is the hardware/software combination called VICONTROLLER by Genesis, who also make a sensor package called COMSENSE. VICONTROLLER includes a plug-in module and software that includes sensing and switching programming controlled by a clock program. You can print out the software for study. It is useful as a means of getting started in automation cheaply and quickly, and can be used with the *Commodore 64 Interfacing Blue Book* and *VIC 20 Interfacing Blue Book* to expand as far as one might wish.

Another valuable resource is *Control Your World with the Commodore VIC 20*, published by Continental

Control System Resources Books and Software

Control Your World with the VIC 20 Computer
Continental Press, Inc.
Elizabethtown, PA 17022
$19.95

Commodore 64 Interfacing Blue Book and **VIC 20 Interfacing Blue Book**
by V. J. Georgiou, Ph.D.
Microsignal Press
P.O. Box 388
Goleta, CA 93116
$16.95 and $14.95, respectively, including postage.

Easy Interfacing Projects for the VIC 20
by Jim Downey, Don Rindsberg, & William Isherwood
Prentice-Hall
$12.95

Circuit Design Program
Nth Digit Solutions
3243 Arlington Avenue, #195
Riverside, CA 92506
$19.95

Past issues of computer and electronics magazines in your local library.

Hardware Sources

I have bought from these people and had good experience with them. There are many other firms listed in computer magazines. Write for literature.

BSR
Rte 303
Blauvelt, NY 10913
(914) 358-6060

Fair Radio Sales
P.O. Box 1105
Lima, OH 45802
(419) 223-2196

Jameco Electronics
1355 Shoreway Road
Belmont, CA 94002
(415) 592-8097

Jance Associates
P. O. Box 234
East Texas, PA 18046
(215) 398-0434

Leviton Manufacturing
5925 Little Neck Pkwy
Little Neck, NY 11362
(212) 229-4040

Quest Electronics
P.O. Box 4430
Santa Clara, CA 95954
(408) 988-1640

Remote Measurement Systems
P.O. Box 15544
Seattle, WA 98115
(206) 525-3369

Savergy, Inc.
1404 Webster Avenue
Fort Collins, CO 80524
(303) 221-4200

Press. This book/tape pair is as handy as a pocket on a shirt. Ostensibly for the VIC 20, the book can be used for several projects for the 64. The manual leads you step by step to building sensors which input to the joystick port and a control board that runs a clock program and several programmable operations based on the input sensor information and output control signals.

Another good resource (and then I'll quit) is *Easy Interfacing Projects for the VIC 20*, by Downey, Rindsberg and Isherwood, from Prentice-Hall. This book has several interesting projects, including a voice synthesizer. The book also makes it easier to understand programming for control applications. With this book you can also make EPROM burners, and your own cartridges. With your own cartridges, you can have the VIC turned on by a clock, boot up from the cartridge, and run a program without a monitor or tape/disk drive to add to the expense of your control system. All automatically.

Another fascinating and related control project is robots. Check your local library for books on building robots. There are several. With them, you can build a fantasia of automation, all controlled by the VIC 20 or Commodore 64. You can build a system as sophisticated or simple as you like. You might even cascade several VIC's which control each other in turn. The possibilities for computer control with Commodore computers is endless, and easy enough that anyone who's not afraid of circuit boards can learn enough to make the science-fiction computer-controlled house or business a here-and-now reality.

1-800-247-9000

If you have questions
If you need answers

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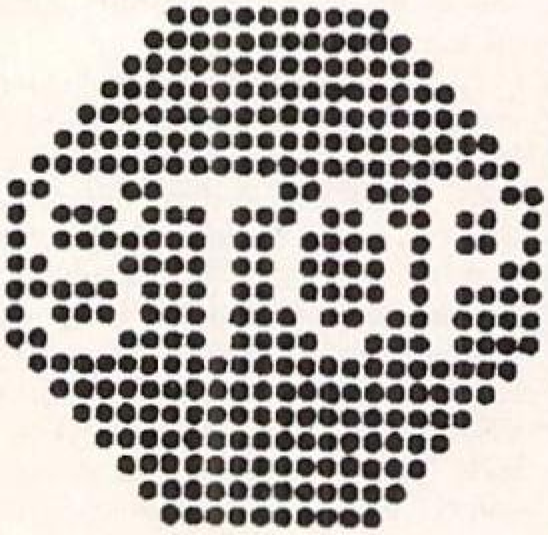
MARCH 4, 1985

http://www.oldgamesitalia.net/ http://www.oldgamesitalia.net/

Sprite Catalog Data

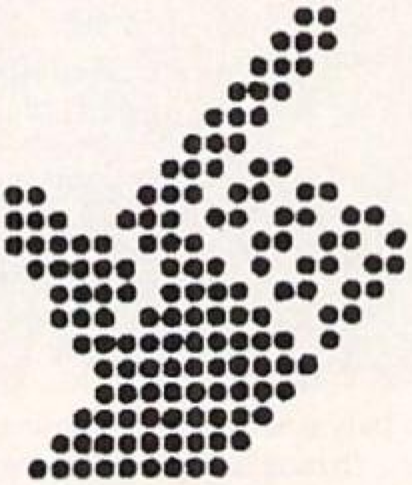
Last issue we ran a program titled "Sprite Catalog" that lets you create a library of sprites, so you don't need to re-invent the wheel everytime you need to use a sprite in a program. We also challenged our readers to submit their best sprites to us to help fellow computerists build their sprite libraries. To get you started, we are including here six sprites produced by "Sprite Catalog" author Andy Gamble, with the data you need to type into your "Sprite Catalog" program. They're all yours.

STOPSIGN



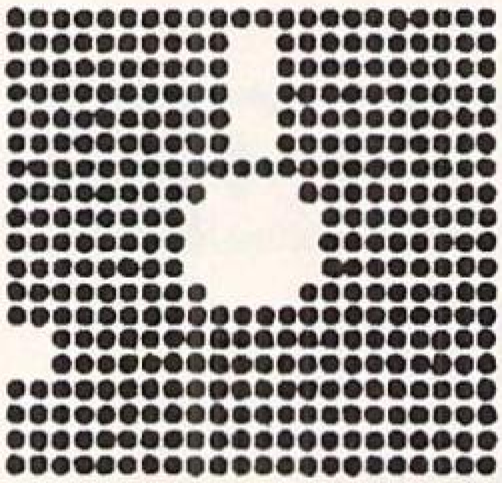
```
1   255 128
3   255 192
7   255 224
15  255 240
31  255 248
63  255 252
127 255 254
198 12  227
187 187 109
191 183 173
199 183 163
251 183 175
187 187 111
199 188 239
127 255 254
63  255 252
31  255 248
15  255 240
7   255 224
3   255 192
1   255 128
```

HAND



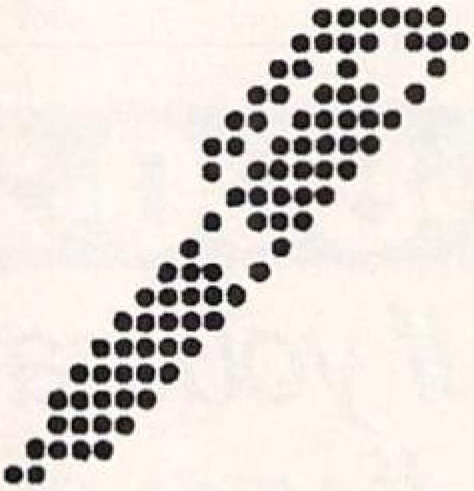
```
0  0   0
0  0   0
0  0   96
0  0   224
0  1   192
0  3   128
0  7   0
0  14  0
0  29  128
12 59  96
14 118 216
15 185 180
7  221 108
3  222 216
3  191 48
1  255 160
0  255 192
0  255 128
1  255 0
3  254 0
7  252 0
```

FLOPPY



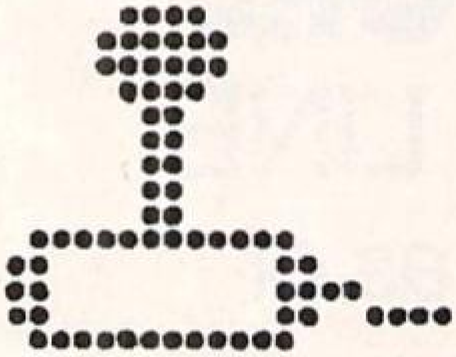
```
0   0   0
127 255 254
127 231 254
127 231 254
127 231 254
127 231 254
127 231 254
127 255 254
127 195 254
127 129 254
127 129 254
127 129 254
127 195 254
127 255 254
31  255 254
31  255 254
127 255 254
127 255 254
127 255 254
127 255 254
0   0   0
```

PEN



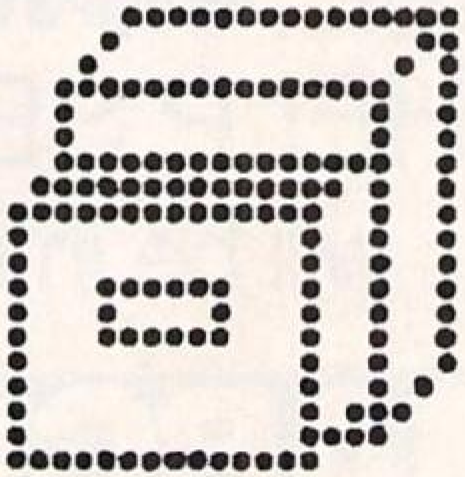
```
0  1   248
0  3   220
0  6   136
0  13  208
0  27  224
0  55  192
0  47  128
0  31  0
0  46  0
0  68  0
0  232 0
1  240 0
3  224 0
7  192 0
15 128 0
31 0   0
30 0   0
60 0   0
96 0   0
0  0   0
0  0   0
```

JOYSTICK



```
0  0   0
0  0   0
0  0   0
0  120 0
0  252 0
0  252 0
0  120 0
0  48  0
0  48  0
0  48  0
0  48  0
0  48  0
7  255 128
12 0   192
12 0   240
12 0   207
7  255 128
0  0   0
0  0   0
0  0   0
0  0   0
```

FILINGCABINET



```
0  0   0
1  255 252
2  0   12
4  0   20
15 255 228
8  0   36
8  0   36
15 255 228
31 255 164
63 255 36
32 1   36
32 1   36
35 241 36
34 17  36
35 241 36
32 1   36
32 1   40
32 1   112
32 1   224
63 255 0
0  0   0
```

BY JAIM ANDREW BAILEY

Real-time Lunar Lander for the Commodore 64

I'm sure you've all seen those lunar lander programs—you enter the thrust you want the lander's engines to put out, and the program calculates how fast the lander is descending, its fuel use, and how hard it hits the ground when it lands.

This program is a little different, a lunar lander game with a new twist. Instead of the program giving you as much time as you like to type your thrust, which is unrealistically easy, it runs in real time. This means that the program doesn't slow down if you don't give it a thrust, just as an actual spacecraft doesn't hang there in space and do nothing if the pilot is asleep at the throttle.

In an "actual" spaceship, the pilot would have a joystick, which he would use to increase and decrease the engine thrust in small increments. This program does the same thing—it uses the joystick to increase and decrease thrust, closely simulating a real lander.

If you're a good pilot, you can react quickly enough to gain control of the lander and guide it to a safe landing. It's not easy though, as the fuel which your engines burn to produce thrust is in short supply, the amount of thrust changes slowly in response to your commands, which makes control of your velocity difficult, and gravity fights against you, attempting to smash the lander to bits on the lunar surface.

Just as the ship can have too little thrust, which causes it to fall very fast and hit the ground very hard, you can also have too much thrust, which causes the lander to leave the moon's weak gravitational field, dooming the astronauts to endless drifting in space.

> *Instead of the program giving you as much time as you like to type your thrust, which is unrealistically easy, it runs in real time.*

Running the program is very simple. Plug a joystick into joystick port two and type RUN, followed by RETURN. The program will spend a few seconds setting up the graphics it uses, and then it will start. The lander is (of course) the spaceship in the middle of the screen. The arrow on the left points to your altitude above the planet, as shown in the column of numbers along the left side of the screen. The arrow on the right side of the screen points to your thrust. This arrow is under the control of the joystick. To move it up, and increase the thrust, push the joystick up. To move the thrust down, which decreases the thrust, pull the joystick down.

If you get too much thrust, you can turn the engines off, which reduces the thrust to zero, by pushing the fire button, but be careful when using this feature because it takes time to move the thrust back up if you need to.

The numbers across the top of the screen, things like fuel, velocity and altitude, give detailed information about the status of the lander. If your fuel goes to zero (runs out), the lander starts to fall freely, which allows it to hit the moon very hard. Your velocity can be either negative or positive. Negative velocity means that the lander is moving down toward the moon, which is the direction you want it to go. Positive velocity, which results from the application of too much thrust, means that the lander is moving up, away from the moon, which is the wrong direction.

Sounds simple, and running the program really is. Mastering it, though, is another problem entirely.

Lunar Lander

```
5 POKE 53280,0:POKE 53281,0'CPLH
6 PRINT"[WHITE,CLEAR,DOWN,SPACE1010]
  REAL TIME LUNAR LANDER"'BAAN
7 PRINT"[DOWN,SPACE11]JOYSTICK IN
  PORT #2":POKE 53269,0:J=56320
  :DIM H$(236)'EXIS
8 FOR I=1 TO 4000:NEXT:POKE 53265,
  11'FQCM
9 F$=CHR$(180) : L$=CHR$(170)'EPQM
10 PRINT CHR$(147)"[RVS,SPACE7]
   PREPARING TO LAUNCH LANDER[SPACE6,
   RVOFF]"'CFVI
11 PRINT"[SPACE2]100[SPACE2]"F$"
   [SPACE24]"L$" 500"'BEME
12 DATA 0.0,.10,.40,1.0,1.5,2.0,5.0,
   10.0,20.0,60.0'BRUH
13 DATA 235,219,203,179,163,155,131,
   115,99'BJIH
14 FOR I=0 TO 9:READ T(I):NEXT
   :FOR I=1 TO 9:READ YB(I):NEXT'KUFL
15 DATA 500,483,466,450,433,415,397,
   387,377,368,359,350,340,330,
   320'BJOO
16 DATA 310,300,290,281,272,263,254,
   244,236,228,220,210,200,192,184,
   176'BNPP
17 DATA 168,161,154,147,140,136,132,
   128,124,120,116,112,108,104,100,
   96'BMDQ
18 DATA 92 ,89 ,86 ,83 ,80 ,77 ,74 ,
   71 ,68 ,65 ,55 ,40 ,30 ,20 ,10 ,
   0  ,'BWHO
19 FOR I=50 TO 236 STEP 3:READ H$(I)
   :NEXT:READ QW$:H$(197)="86 "'IBEQ
20 PRINT"[SPACE2]80.0 "F$"[SPACE24]
   "L$" 450"'BENE
30 PRINT"[SPACE2]60.0 "F$"[SPACE24]
   "L$" 400"'BEGF
40 PRINT"[SPACE2]50.0 "F$"[SPACE24]
   "L$" 375"'BEQG
```

```
50 PRINT"[SPACE2]40.0 "F$"[SPACE24]
   "L$" 350"'BEIH
60 PRINT"[SPACE2]30.0 "F$"[SPACE24]
   "L$" 325"'BEJI
70 PRINT"[SPACE2]20.0 "F$"[SPACE24]
   "L$" 300"'BEBJ
80 PRINT"[SPACE2]15.0 "F$"[SPACE24]
   "L$" 275"'BEQK
90 PRINT"[SPACE2]10.0 "F$"[SPACE24]
   "L$" 250"'BEEL
100 PRINT"[SPACE2]7.50 "F$"[SPACE24]
    "L$" 225"'BERB
110 PRINT"[SPACE2]5.00 "F$"[SPACE24]
    "L$" 200"'BEDC
120 PRINT"[SPACE2]4.00 "F$"[SPACE24]
    "L$" 175"'BEND
130 PRINT"[SPACE2]3.00 "F$"[SPACE24]
    "L$" 150"'BEFE
140 PRINT"[SPACE2]2.00 "F$"[SPACE24]
    "L$" 140"'BEDF
150 PRINT"[SPACE2]1.50 "F$"[SPACE24]
    "L$" 130"'BEGG
160 PRINT"[SPACE2]1.25 "F$"[SPACE24]
    "L$" 120"'BEHH
170 PRINT"[SPACE2]1.00 "F$"[SPACE24]
    "L$" 110"'BEYI
180 PRINT"[SPACE2]0.80 "F$"[SPACE24]
    "L$" 100"'BEFJ
190 PRINT"[SPACE2]0.60 "F$"[SPACE24]
    "L$"[SPACE2]90"'BETK
200 PRINT"[SPACE2]0.40 "F$"[SPACE24]
    "L$"[SPACE2]80"'BEQC
210 PRINT"[SPACE2]0.20 "F$"[SPACE24]
    "L$"[SPACE2]70"'BEND
220 PRINT"[SPACE2]0.10 "F$"[SPACE24]
    "L$"[SPACE2]60"'BELE
230 PRINT"[SPACE2]0.05 "F$"[SPACE24]
    "L$"[SPACE2]30"'BEMF
240 PRINT"[SPACE2]0.00 "CHR$(204);
    :FOR I=1 TO 24:PRINT CHR$(175);
    :NEXT:PRINT CHR$(186);'KBQM
250 PRINT"[SPACE3]0";'BBAC
300 V=53248:POKE V+16,2:POKE 53265,27
    :POKE V+21,0'GCIG
301 FOR I=0 TO 3:POKE 2040+I,250+I
    :POKE V+39+I,1:NEXT'KWMJ
302 FOR I=0 TO 7:P(I)=2^I:NEXT:D=1:E=2
    :F=7:G=8:H=16000:C=64:A=20
    :Z=3'OQPR
310 FOR I=.TO 144:READ T
    :IF T<0 THEN FOR J=1 TO-T
    :POKE H+P+J,0:NEXT:P=P-T
    :GOTO 320'SDQP
315 P=P+1:POKE H+P,T'EIQH
320 NEXT'BAEY
321 A=100.0:L$="[SPACE7]"'CJEE
330 X1=V:Y1=V+1:X2=V+2:Y2=V+3:X3=V+4
    :Y3=V+5:X4=V+6:Y4=V+7'PNNU
335 T=51:B=236:L=18:R=65'EQBL
340 POKE X1,L:POKE X2,R:F$="5000"
    :POKE X3,160:POKE Y3,T
    :POKE V+29,12'HGLN
350 POKE V+23,8:POKE V+21,7:J=56320
    :E=125:Q=126:G=3:C=162
    :PRINT"[HOME,RVS]";'KNTR
360 V$="0.0000":A$="100.00"'CFWH
370 I=2.4:U=212:POKE Y1,T:POKE Y2,U
    :R=2000:S=5000:T=10:Y=200'IPCS
375 C=16:D=6:POKE V+21,7'EMNO
380 PRINT"[RVS]ALT="A$" VEL="V$"
    THR="H$(U)" FUEL="F$
    :PRINT"[UP]";'CNLO
385 F=5000:W=0:A=100'DNMO
390 PRINT"[RVS,RIGHT4]"A$"[RIGHT5]
    "V$"[RIGHT5]"H$(U)"[RIGHT6]"F$
    :PRINT"[UP]";'CNIM
400 Z=PEEK(J):IF Z=E AND(U<B)THEN
    U=U+G:POKE Y2,U:GOTO 420'LXRK
403 IF Z=Q AND(U>T)THEN U=U-G
    :IF U>50 THEN POKE Y2,U
    :GOTO 420'MVKO
404 IF U<50 THEN U=50'EGLG
407 IF(Z AND C)=.THEN U=B
    :POKE Y2,U'GMML
420 X=VAL(H$(U)):F=F-X/T
    :V2=(R*X/(S+F))-T*I:W=W+V2/T
    :A=A+W/Y'RMNV
430 A$=LEFT$(STR$(A)+L$,D)
    :V$=LEFT$(STR$(W)+L$,D)
    :F$=MID$(STR$(F)+L$,2,4)'MMPR
440 GOSUB 500'BDID
445 IF A>.01 THEN 450'DHAK
446 GOTO 470'BDKJ
450 IF F>=.THEN 390'EFOG
460 PRINT CHR$(19)CHR$(18)"[SPACE10]
    YOU ARE OUT OF FUEL[SPACE10]"
    :GOTO 474'EMEQ
470 PRINT"[DOWN2,RIGHT,SPACE38,RVS]
    THROTTLE LOCKED UP"'BAYM
471 PRINT"[RIGHT,SPACE310,RVS]
    RETROS FIRING"'BAVL
472 PRINT"[RIGHT,SPACE310,RVS]
    BEGIN LANDING[RVOFF]"'BACN
474 Q=237-PEEK(Y1):FOR I=1 TO Q
    :Z=PEEK(Y1)+1:POKE Y1,Z
    :POKE Y3,Z-5'MFLY
475 FOR L=1 TO 80:NEXT:NEXT
    :POKE Y1,235:IF F<.THEN 482'JTIT
480 IF W>=-5 THEN GOTO 485'GFUK
481 IF W>=-15 THEN 490'FGDL
482 PRINT"[DOWN2,RIGHT,SPACE59,RVS]
    WAY TOO HARD[RVOFF]"
    :POKE 2042,253'CJAQ
483 PRINT"[DOWN2,RIGHT9] [RVS]
    YOU BOUGHT THE FARM[RVOFF]"'BASQ
484 POKE X3+2,160:POKE Y3,225
    :GOTO 650'ESOQ
485 PRINT"[DOWN2,RIGHT13,RVS]
    GREAT LANDING[RVOFF]"
    :GOTO 650'CEKS
490 PRINT"[DOWN2,RIGHT,SPACE28,RVS]
    NOT SO HOT, BUT[RVOFF]"'BALN
491 PRINT"[DOWN2,RIGHT,SPACE48,RVS]
    YOU MADE IT[RVOFF]"'BASN
492 GOTO 650'BDKK
500 IF A<0 THEN RETURN'ECCB
```

```
501 IF A<T(1)THEN Y=YB(1)-(A-T(0))*160
    :GOTO 600'IAYK
510 IF A<T(2)THEN Y=YB(2)-(A-T(1))*80
    :GOTO 600'IYFK
520 IF A<T(3)THEN Y=YB(3)-(A-T(2))*40
    :GOTO 600'IYEL
530 IF A<T(4)THEN Y=YB(4)-(A-T(3))*32
    :GOTO 600'IYIM
540 IF A<T(5)THEN Y=YB(5)-(A-T(4))*16
    :GOTO 600'IYNN
550 IF A<T(6)THEN Y=YB(6)-(A-T(5))*8
    :GOTO 600'IXTO
560 IF A<T(7)THEN Y=YB(7)-(A-T(6))*3.2
    :GOTO 600'IANP
570 IF A<T(8)THEN Y=YB(8)-(A-T(7))*1.6
    :GOTO 600'IASQ
580 IF A<T(9)THEN Y=YB(9)-(A-T(8))*.8
    :GOTO 600'IYYR
590 Y=67-(A-T(9))*.4'EMAN
600 IF Y>50 THEN POKE Y1,INT(Y)
    :POKE Y3,INT(Y):CO=0:RETURN'JVUK
605 CO=CO+1:IF CO<15 THEN RETURN'GKKL
610 PRINT"[DOWN2,RIGHT10,RVS]
    YOU ARE LEAVING THE[RVOFF]"'BAXI
615 PRINT"[RIGHT7,RVS]MOON'S
    GRAVITATIONAL FIELD[RVOFF]"'BABP
620 PRINT"[RIGHT8,RVS]AND WILL DRIFT
    ENDLESSLY[RVOFF]"'BAJK
625 PRINT"[RIGHT6,RVS]IN THE DARK
    REACHES OF SPACE[RVOFF]"'BAGQ
650 PRINT CHR$(19)CHR$(18)"[SPACE6]
    F1 TO PLAY AGAIN, F3 TO STOP
    [SPACE5]"'DIQR
652 GET A$:IF A$=CHR$(133)THEN RESTORE
    :POKE V+21,0:POKE 53265,11
    :GOTO 9'KCES
653 IF A$=CHR$(134)THEN POKE V+21,0
    :PRINT CHR$(147):POKE 46,66
    :END'KAXT
654 GOTO 652'BDMK
700 DATA -18,4,-2,7,-2,7,192,3,255,
    240,255,255,252,3,255,240,0,7,192,
    0,7'BNMN
701 DATA -2,4,-36,64,0,1,192,0,7,192,
    0,31,255,192,127,255,192,31,255,
    192'BNWO
702 DATA 7,192,0,1,192,-2,64,-39,129,
    0,1,129,128,7,255,224,30,126,120,
    252'BOQP
703 DATA 60,63,30,126,120,7,255,224,1,
    255,128,1,129,128,3,0,192,15,
    129'BLCQ
704 DATA 240,-16,15,197,224,31,247,
    226,29,255,254,125,254,124,127,
    255'BKDR
705 DATA 254,255,255,255,199,187,187,
    219,17,147,219,85,131,219,85,
    171'BKWS
706 DATA 199,85,187,219,85,187,219,85,
    187,219,17,187,199,187,187,255,
    255'BNEU
707 DATA 254,127,239,254,127,239,254,
    63,255,228,32,253,196,3,157,
    128'BJDU
```

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BY BRUCE JAEGER

States of the Union
for the Commodore 64 and Expanded VIC 20

"States of the Union" is a challenging quiz program that tests your knowledge of what states touch the border of any individual state. Some answers are easy; Maine, for example, touches only the state of New Hampshire. (The program doesn't include Canada or Mexico.) Tennessee, on the other hand, is bordered by eight other states! Can you name them without looking at a map?

Also included in the program is a "tutor" mode. You are asked to type in a state name, and the program responds with the names of the surrounding states.

The computer requires that you spell each state's name correctly. You have the option of using the two-letter postal abbreviation in place of the state's name; in fact, the program can also be used to test your recall of those abbreviations.

Note: the District of Columbia, while not actually a state, is treated as one by the program. (Its postal abbreviation, DC, is much easier to type!)

In the "Quiz" section of the program, states are randomly selected and you are asked to name the surrounding states. (You're given the hint of how many states surround the test state.) You may choose another test state by pressing a blank RETURN.

The program as written will run on the Commodore 64, and the VIC 20 with at least 3K of memory expansion. **C**

> *"States of the Union" is a challenging quiz program that tests your knowledge of what states touch the border of any individual state.*

100 - 520's in Wastebasket

States of the Union

```
100 REM ***************************'BASY
110 REM **                       **'BEEW
120 REM ** STATES OF THE UNION **'BUKD
130 REM **                       **'BEEY
140 REM **     BRUCE JAEGER      **'BPKD
150 REM **                       **'BEEB
160 REM **   ST. PAUL, MINN      **'BQFF
170 REM **                       **'BEED
180 REM ***************************'BASH
190 C=0:IF PEEK(57344)=133 THEN
    C=1'GPAL
200 REM 0=VIC, 1=64'BKAX
210 IF C=1 THEN 250'DFNY
220 POKE 36879,8'BHMA
230 POKE 36878,0'BHDB
240 GOTO 270'BDIB
250 POKE 53280,0:POKE 53281,0'CPLF
260 POKE 54272+24,8'CJPF
270 S6=54272:SV=36876'CPAH
280 HC$=CHR$(147)'CIVH
290 UC$=CHR$(142)+CHR$(8)'ELXK
300 RV$=CHR$(18)'CHEY
310 RO$=CHR$(146)'CIQB
320 WH$=CHR$(5)'CGSB
330 GR$=CHR$(153)'CIGD
340 IF C=0 THEN GR$=CHR$(30)'FJOG
350 RD$=CHR$(150)'CIAF
360 IF C=0 THEN RD$=CHR$(28)'FJSI
370 X=RND(-TI)'DFSH
380 GOSUB 1430: REM READ DATA'CNIJ
390 PRINT HC$ "PRESS:"'BDVJ
400 PRINT:PRINT "Q FOR QUIZ,"'CBWC
410 PRINT:PRINT "T FOR TUTOR,"'CBLD
420 PRINT:PRINT "E FOR END."'CBDD
430 POKE 198,0:WAIT 198,1:GET A$'DOJF
440 IF A$<>"T"AND A$<>"Q"AND
    A$<>"E"THEN 430'KJKL
450 IF A$="E" THEN PRINT CHR$(9)
    :END'GGAI
460 IF A$="Q" THEN 650'DFDH
470 REM *** TUTORIAL SECTION ***'BVUL
480 PRINT HC$'BDVH
490 INPUT "NAME OF STATE";S$'BDJL
500 GOSUB 1060    : REM CHECK
    SPELLING'CSQE
510 PRINT HC$ RV$ S$(X) " (" PC$(X)
    ")" RO$ " TOUCHES:"'BUWI
520 PRINT'BACB
530 IF LEN (T$(X))=0 THEN PRINT "NO
    OTHER STATES!":GOTO 590'GMOM
540 FOR Y= 1 TO LEN(T$(X))'EJYH
550 Z$=MID$(T$(X),Y,1)'CNCI
560 Z=ASC(Z$)'CFKH
570 PRINT S$(Z)'BFLH
580 NEXT Y'BBSH
590 PRINT:PRINT'CBHJ
600 PRINT RV$ "ANOTHER?" RO$ "
    (Y/N)"'BGFF
610 POKE 198,0:WAIT 198,1:GET A$'DOJF
620 IF A$<>"Y" THEN 390'EFPF
630 GOTO 480'BDLE
640 REM *** QUIZ SECTION ***'BRHI
650 S=INT(RND(1)*51)+1'FJCK
660 IF S=2 OR S=11 THEN 650'FIBL
670 QS$=S$(S):QC$=PC$(S)'CSWM
```

* Will not o

```
680 L=LEN(T$(S)):NG=0'DMWM
690 PRINT HC$ RV$ QS$ RO$'BMKM
700 PRINT:PRINT "TOUCHES"LEN(T$(S))
    "STATES"'DIBI
710 PRINT:PRINT "THEY ARE:"'CBXF
720 QT$=LEFT$("========",L)'CHBH
730 IF NG=L THEN 950:REM ALL
    STATES'EQQK
740 PRINT:S$=""'CDBG
750 INPUT "STATE:";S$'BDWI
760 IF S$=""THEN 650:REM NEW
    STATE'EOQN
770 IF S$=QS$ OR S$=QC$ THEN PRINT
    RV$ "SILLY!":GOTO 740'HRRS
780 GOSUB 1060  :REM CHECK
    SPELLING'CSQO
790 SG=X:SG$=CHR$(X)'DKOO
800 FOR Y= 1 TO L'DDWE
810 IF MID$(QT$,Y,1)<>SG$THEN NEXT
    Y'GNTJ
820 IF Y>L THEN 860'DFMH
830 PRINT "YOU ALREADY GUESSED"'BAXK
840 PRINT RV$ S$(ASC(SG$)) "!"'CMKK
850 GOTO 730'BDJI
860 FOR Y= 1 TO L'DDWK
870 IF MID$(T$(S),Y,1)<>SG$ THEN NEXT
    Y'GPVQ
880 IF Y>L THEN 920'DFJN
890 PRINT RV$ GR$ "CORRECT!" WH$'BJGQ
900 QT$=LEFT$(QT$,NG)+SG$+LEFT$
    ("========",L-NG-1)'HVEO
910 NG=NG+1:GOTO 730'DJUI
920 PRINT RV$ RD$ "INCORRECT!"
    WH$'BJGK
930 GOSUB 1210'BEFH
940 GOTO 740'BDKI
950 PRINT'BACI
960 PRINT RV$ GR$ "EXCELLENT!"'BGPN
970 PRINT "YOU'VE GUESSED ALL" L'BBUP
980 PRINT "STATES THAT TOUCH"'BALQ
990 PRINT QS$ "!" WH$'BGTO
1000 PRINT:PRINT'CBHT
1010 PRINT RV$ "ANOTHER?" RO$ "
     (Y/N)"'BGFY
1020 POKE 198,0:WAIT 198,1:GET A$'DOJY
1030 IF A$<>"Y" THEN 390'EFPY
1040 GOTO 650'BDKX
1050 REM CHECK STATE NAME'BORC
1060 IF LEN(S$)<>2 THEN 1110'FJWE
1070 FOR X= 1 TO 51'DEWC
1080 IF S$<>PC$(X) THEN NEXT X'FJUG
1090 IF X<=51 THEN RETURN'FDBF
1100 GOTO 1140'BEDU
1110 FOR X= 1 TO 51'DEWW
1120 IF S$<>S$(X) THEN NEXT X'FIHB
1130 IF X<=51 THEN RETURN'FDBA
1140 PRINT'BACX
1150 PRINT RD$ RV$ "NO SUCH STATE!"
     RO$'BJLF
1160 PRINT WH$"(CHECK YOUR
     SPELLING!)"'BDTH
1170 PRINT'BACB
1180 INPUT "NAME OF STATE";S$'BDJG
1190 GOTO 1060'BEEE
1200 REM MISSES'BGXW
1210 IF C=0 THEN 1330  :REM VIC'EKAA
1220 FOR Q= 0 TO 24:POKE S6+Q,0
     :NEXT'GLRD
1230 POKE S6+24,8'CGWA
1240 POKE S6+5,192:POKE S6+6,250'EPUE
1250 FOR Q= 120 TO 80 STEP-3'FHTE
1260 POKE S6+1,Q:POKE S6+4,17'EMRG
1270 FOR DE= 1 TO 4:NEXT DE,Q'EJJG
1280 POKE S6+24,15:POKE S6+1,15'EOLI
1290 POKE S6+4,128'CHVG
1300 FOR VO= 15 TO 0 STEP-1'FGAA
1310 FOR DE= 1 TO 10:NEXT DE'EIEB
1320 POKE S6+24,VO:NEXT:RETURN'EJHC
1330 POKE SV+2,10'CGSB
1340 FOR VO= 250 TO 220 STEP-1'FJSF
1350 POKE SV,VO'BFRD
1360 FOR DE= 1 TO 4:NEXT DE,VO'EKSG
1370 POKE SV,0:POKE SV+1,200'DMYH
1380 FOR VO= 15 TO 0 STEP-.05'FIXI
1390 POKE SV+2,VO:NEXT'DHSI
1400 POKE SV+1,0:RETURN'DGMA
1410 RETURN'BAQX
1420 REM *** READ STATE DATA ***'BTPE
1430 PRINT HC$ UC$ RV$ WH$
     "STATES"'BMIF
1440 PRINT:PRINT"READING DATA..."'CBFG
1450 DIM S$(51),T$(51),PC$(51)'BVSG
1460 FOR X= 1 TO 51'DEWF
1470 READ PC$(X),S$(X)'BMAH
1480 READ N : IF N=0 THEN 1530'EIHJ
1490 FOR Y= 1 TO N'DDYI
1500 READ Z'BBYX
1510 T$(X)=T$(X)+CHR$(Z)'DNQE
1520 NEXT Y'BBSA
1530 NEXT X'BBRB
1540 RETURN'BAQC
1550 REM *** STATE DATA ***'BPMH
1560 DATA AL,ALABAMA,4,24,42,10,9'BXTJ
1570 DATA AK,ALASKA,0'BLRI
1580 DATA AZ,ARIZONA,5,5,28,44,6,
     31'BAJM
1590 DATA AR,ARKANSAS,6,43,36,25,42,
     24,18'BGHO
1600 DATA CA,CALIFORNIA,3,37,28,3'BXTE
1610 DATA CO,COLORADO,7,3,44,50,27,16,
     36,31'BIYH
1620 DATA CT,CONNECTICUT,3,32,21,
     39'BAFH
1630 DATA DE,DELAWARE,3,20,38,30'BWSH
1640 DATA FL,FLORIDA,2,1,10'BRMH
1650 DATA GA,GEORGIA,5,1,42,33,40,
     9'BAMK
1660 DATA HI,HAWAII,0'BLDI
1670 DATA ID,IDAHO,6,37,47,26,50,44,
     28'BDBM
1680 DATA IL,ILLINOIS,5,25,15,49,14,
     17'BDJN
1690 DATA IN,INDIANA,4,13,22,35,
     17'BYAN
1700 DATA IA,IOWA,6,27,41,23,49,13,
     25'BCLG
```

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STATES

```
1710 DATA KS,KANSAS,4,6,27,25,36'BWPG
1720 DATA KY,KENTICKY,7,25,13,14,35,
     48,46,42'BJGK
1730 DATA LA,LOUISIANA,3,43,4,24'BWVI
1740 DATA ME,MAINE,1,29'BNIH
1750 DATA MD,MARYLAND,5,48,38,8,46,
     51'BCEL
1760 DATA MA,MASSACHUSETTS,5,32,45,29,
     7,39'BHLO
1770 DATA MI,MICHIGAN,3,49,14,35'BWLM
1780 DATA MN,MINNESOTA,4,41,34,49,
     15'BBQO
1790 DATA MS,MISSISSIPPI,4,18,4,42,
     1'BBOP
1800 MO,MISSOURI,8,36,16,27,15,13,17,
     42,4'ALMJ
1810 DATA MT,MONTANA,4,12,34,41,
     50'BYCI
1820 DATA NE,NEBRASKA,6,6,50,41,15,25,
     16'BFNK
1830 DATA NV,NEVADA,5,5,37,12,44,
     3'BYTJ
1840 DATA NH,NEW HAMPSHIRE,3,45,19,
     21'BBHL
1850 DATA NJ,NEW JERSEY,3,38,32,8'BWML
1860 DATA NM,NEW MEXICO,5,3,44,6,36,
     43'BCON
1870 DATA NY,NEW YORK,5,45,21,7,30,
     38'BBVO
1880 DATA NC,NORTH CARLINA,4,42,46,40,
     10'BEFQ
1890 DATA ND,NORTH DAKOTA,3,26,23,
     41'BAXQ
1900 DATA OH,OHIO,5,14,22,38,48,
     17'BYKH
1910 DATA OK,OKLAHOMA,6,31,6,16,25,4,
     43'BECK
1920 DATA OR,OREGON,4,5,47,12,28'BWAJ
1930 DATA PA,PENNSYLVANIA,6,35,32,30,
     8,20,48'BJTN
1940 DATA RI,RHODE ISLAND,2,7,21'BVXL
1950 DATA SC,SOUTH CAROLINA,2,10,
     33'BYHN
1960 DATA SD,SOUTH DAKOTA,6,50,26,23,
     34,15,27'BJTQ
1970 DATA TN,TENNESSEE,8,4,25,17,46,
     33,10,1,24'BLMR
1980 DATA TX,TEXAS,4,31,36,4,18'BVOP
1990 DATA UT,UTAH,6,28,12,50,6,31,
     3'BARQ
2000 DATA VT,VERMONT,3,29,21,32'BVDY
2010 DATA VA,VIRGINIA,6,17,48,20,33,
     42,51'BGMC
2020 DATA WA,WASHINGTON,2,37,12'BVDB
2030 DATA,WV,WEST VIRGINIA,5,35,17,38,
     2,46'BHFF
2040 DATA WI,WISCONSIN,4,23,15,22,
     13'BBYE
2050 DATA WY,WYOMING,6,12,26,41,27,6,
     44'BEQG
2060 DATA DC,DISTRICT OF COLUMBIA,2,
     20,46'BEEH
```

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BY BRUCE JAEGER

Easter Egg Hunt
for Young Commodore 64 Users

Here's an entertaining game for the younger Commodore 64 users. The object is to find the five colored Easter eggs lying hidden in the field. You use the joystick (in port two) to move a blue and white eye around until you spot these eggs. Once found, the eggs drop into the waiting Easter basket. (Holding down the fire button will make the eye move faster.)

The program keeps track of the time taken to find the eggs, and remembers the lowest score. You can change the difficulty factor by raising or lowering the value of variable DF in line 130; this affects how often the hidden eggs will flash on the screen.

More advanced programmers will note that the game takes advantage of sprite-to-character priorities (where some sprites are in front of the characters and some sprites are hidden behind them), and the sprite-to-sprite collision register. All eight sprites are used.

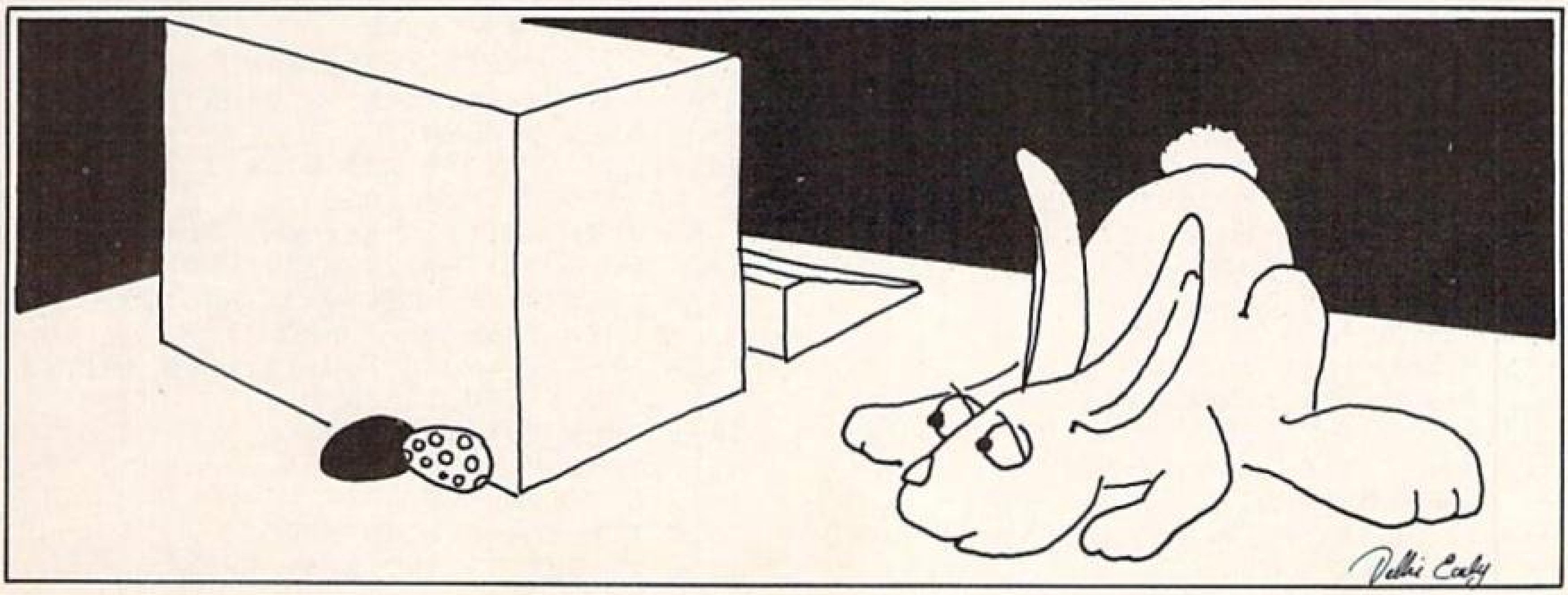
Also note line 2010. The WAIT statement there will wait for movement of the joystick without filling the screen full of annoying "sparkle."

Happy Easter!

Easter Egg Hunt

```
110 REM BRUCE JAEGER'BLXY
120 REM'BARW
130 DF=7:REM DIFFICULTY FACTOR'CUME
140 REM      (GREATER IS HARDER)'BRJE
150 POKE 53280,7:POKE 53281,1'CPTE
160 CL$=CHR$(147):HO$=CHR$(19)
    :PRINT CL$'FUYI
170 RE$=CHR$(150):GR$=CHR$(153)'ERQI
180 YE$=CHR$(158):BL$=CHR$(154)'ERVJ
190 PU$=CHR$(156):BK$=CHR$(144)'ERYK
200 RV$=CHR$(18):RO$=CHR$(146)'EQXC
210 J2=56320:V=53248:POKE V+21,0'EUGE
220 SD=54272'BHBA
230 DEF FN R(X)=INT(RND(1)*X)+1'HLKG
240 X=FN R(-TI) : IN=4 : HS=99999'FSTH
250 POKE 53272,21'BIPD
260 FOR X=1 TO 10:READ Z'EGTF
270 BC$=BC$+CHR$(Z):NEXT'EKTH
280 DATA 5,5,5,5,30,30,153,153,158,
    155'BEUK
290 FOR X=1 TO 6:READ EC(X):NEXT'FKRK
300 DATA 3,4,8,10,14,14'BOPA
310 FOR X=0 TO 7:READ S(X):NEXT'FJPD
320 DATA 1,2,4,8,16,32,64,128'BULD
330 CC$=HO$:FOR X=1 TO 25'ELYF
340 CC$=CC$+CHR$(17):NEXT'ELKF
350 PRINT CL$ LEFT$(CC$,12);'CMQF
360 PRINT YE$ TAB(12)"EASTER EGG
    HUNT!"'CGGJ
370 PRINT GR$ TAB(12) "--------------
    --"'CGAJ
380 PRINT:PRINT RE$'CENH
390 PRINT TAB(9 ) "FIND FIVE EASTER
    EGGS"'CCSN
400 PRINT'BACX
410 PRINT TAB(10) "AS FAST AS YOU
    CAN!"'CDEF
420 FOR X=832 TO 1022 : READ Y'EKUE
430 POKE X,Y:NEXT X:POKE V+16,0'ELCG
440 GOSUB 2060'BEJD
450 POKE 2040,15:POKE 2041,14'CPYH
460 FOR X=2042 TO 2047:POKE X,13
    :NEXT'FPGK
470 REM SPRITE COLORS'BMFJ
480 POKE V+39,6 :REM EYE'DJRK
490 POKE V+40,11:REM BASKET'DNMM
500 POKE V+41,1:REM EYE'DJFD
510 PRINT CL$'BDAB
520 PRINT HO$ RV$ RE$ "READY..." RO$;
    'BNAG
530 PRINT"[SPACE11]"'BAXD
540 POKE V+21,0'CFKF
550 PRINT HO$'BDIF
```

Continued next page



EASTER EGG

```
 560 FOR X=41 TO 840 : R=FN R(10)'FNXL
 570 PRINT MID$(BC$,R,1) RV$ " ";'CNTK
 580 NEXT:PRINT'CBJI
 590 PRINT CHR$(30):FOR X=1 TO 40'FJSN
 600 PRINT CHR$(168);:NEXT'DHUD
 610 FOR X=1 TO 39:PRINT CHR$(166);
     :NEXT'GMYH
 620 POKE 2023,102:POKE 56295,5'CQOG
 630 GOSUB 1730'BEME
 640 POKE V+2,96:POKE V+3,221
     :REM BASKET'FTVL
 650 PRINT LEFT$(CC$,24);'CJPI
 660 PRINT TAB(9)RV$YE$"[SPACE3]";'CJXJ
 670 POKE V+21,2'CFMJ
 680 PRINT HO$ RV$ BL$ "GET
     SET..."'BJFN
 690 POKE V,200:POKE V+1,215
     :REM EYE'EQDP
 700 POKE V+4,204:POKE V+5,222
     :REM EYE'FRBI
 710 YE=215:XE=200'CLDG
 720 POKE V+21,255'CHSF
 730 FOR X=7 TO 15 STEP 2'EFQH
 740 POKE V+X,FN R(145)+60'ELNK
 750 NEXT'BAEG
 760 FOR X=3 TO 7'DDCJ
 770 XP=FN R(250)+25'DKXM
 780 IF XP<255 THEN 810'DISM
 790 POKE V+X*2,XP-255'EJGO
 800 POKE V+16,(PEEK(V+16)OR S(X))
     :GOTO 820'GTDJ
 810 POKE V+X*2,XP:POKE V+16,
     PEEK(V+16)AND 255-S(X)'JXMO
 820 NEXT'BAEE
 830 IF PEEK(V+30)<>5 THEN 730'GJSK
 840 FOR X=V+42 TO V+46'FHEK
 850 POKE X,EC(FN R(6)):NEXT'DLUL
 860 POKE V+21,255'CHSK
 870 FOR X=1 TO 240-20*DF:POKE V+27,0
     :POKE V+27,248:NEXT'KYRU
 880 PRINT HO$ "[SPACE19]"'BDEN
 890 TI$="000000":GOSUB 2280'CISP
 900 REM LOOP'BEAE
 910 PRINT HO$ BK$ TAB(33) TI'CLLH
 920 PRINT HO$ RE$ "EGGS: "SC'BIQJ
 930 IF SC=5 THEN 1780'DHBJ
 940 J=31-(PEEK(56320)AND 31)'EOEM
 950 IF J=0 THEN 900'DFVK
 960 FB=J AND 16:IF FB THEN
     J=ABS(16-J)'HOLQ
 970 FF=1:IF FB THEN FF=4'EJMO
 980 ON J GOSUB 1010,1020,1000,1030,
     1040,1050,1000,1060,1070,1080'CALV
 990 GOTO 1090'BEHN
1000 RETURN:REM NULL'CFUU
1010 YE=YE-IN*FF:RETURN'EJWY
1020 YE=YE+IN*FF:RETURN'EJVA
1030 XE=XE-IN*FF:RETURN'EJUB
1040 XE=XE-IN*FF:YE=YE-IN*FF
     :RETURN'HSHG
1050 XE=XE-IN*FF:YE=YE+IN*FF
     :RETURN'HSGH
1060 XE=XE+IN*FF:RETURN'EJTE
1070 XE=XE+IN*FF:YE=YE-IN*FF
     :RETURN'HSGJ
1080 XE=XE+IN*FF:YE=YE+IN*FF
     :RETURN'HSFK
1090 IF YE<52 THEN YE=52'EIKG
1100 IF YE>204 THEN YE=204'EKCX
1110 IF XE>322 THEN XE=322'EKCY
1120 IF XE<20 THEN XE=20'EIXA
1130 POKE V+1,YE:POKE V+5,YE+7'FMQD
1140 IF XE>255 THEN 1190'DJFB
1150 POKE V,XE:POKE V+16,
     PEEK(V+16)AND 254'GRVG
1160 IF XE+4>255 THEN 1180'EKUE
1170 POKE V+4,XE+4:POKE V+16,
     PEEK(V+16)AND 251:GOTO 1210'JYEM
1180 POKE V+4,XE+4-255:POKE V+16,
     PEEK(V+16)OR 4:GOTO 1210'KACO
1190 POKE V,XE-255:POKE V+16,
     PEEK(V+16)OR 1'HSML
1200 POKE V+4,XE+4-255:POKE V+16,
     PEEK(V+16)OR 4:GOTO 1210'KACH
1210 REM FIND EGG?'BISX
1220 CK=PEEK(V+30):POKE V+30,0'FNTD
1230 IF CK=5 OR CK=0 THEN 900
     :REM NO'GMWE
1240 S=0:PK=CK-5:FOR X=3 TO 7'GMCF
1250 IF PK=S(X)THEN S=X'EIPE
1260 NEXT'BAEB
1270 IF PK AND 1 THEN 900'DGTF
1280 IF S=0 THEN 900'DFAG
1290 T3=PEEK(162):T2=PEEK(161)
     :T1=PEEK(160)'GXDN
1300 SY=PEEK(V+1+S*2)'FIYB
1310 SX=PEEK(V+S*2)'EHKB
1320 IF PEEK(V+16)AND PK=PK THEN
     SX=SX+254'IQSH
1330 Z=1:IF SX>100 THEN Z=-1'GKAF
1340 IF SX>300 THEN SX=SX-255'FMLG
1350 GOSUB 2250'BEKC
1360 FOR X=SX TO 100 STEP Z*5
     :GOSUB 1520'GNVI
1370 IF X>255 THEN 1410'DIGG
1380 POKE SD+1,255-X:POKE SD+4,17'FPXK
1390 POKE V+S*2,X:POKE V+16,
     PEEK(V+16)AND 255-PK'JULP
1400 GOTO 1430'BEFX
1410 POKE V+S*2,X-255'EIVC
1420 POKE V+16,PEEK(V+16)OR PK'FLNE
1430 NEXT X'BBRA
1440 FOR X=SY TO 230 STEP 3
     :GOSUB 1520'FMSG
1450 POKE SD+1,255-X:POKE SD+4,17'FPXI
1460 POKE V+1+S*2,X:NEXT'FHBH
1470 POKE V+21,PEEK(V+21)AND 255-PK
     :REM TURN OFF'HWAO
1480 SC=SC+1:POKE 162,T3:POKE 161,T2
     :POKE 160,T1'FBKO
1490 POKE SD+4,0'CFDI
1500 POKE V+27,248'CHBA
1510 GOTO 900'BDIA
1520 REM FLASH EGGS'BJJD
1530 IF X/4 <> INT(X/4) THEN
```

```
     RETURN'IGFH
1540 IF KT=DF THEN KT=1:POKE V+27,0
     :RETURN'HOLJ
1550 KT=KT+1:POKE V+27,248-PK
     :RETURN'GQUK
1560 DATA 7,224,0,31,248,0,63,252,0,
     63'BDSJ
1570 DATA 252,0,31,248,0,7,224,0,0,0,
     0'BDVK
1580 DATA 0,0,0,0,0,0,0,0,0,0,0,0,
     0'BCTL
1590 DATA 0,0,0,0,0,0,0,0,0,0,0,0,
     0'BCTM
1600 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,
     0'BELE
1610 DATA 0,254,0,3,1,128,12,0,96,
     16'BBNF
1620 DATA 0,16,32,0,8,64,0,4,64,0,
     4'BAIG
1630 DATA 128,0,2,128,0,2,128,0,2,
     128'BCKH
1640 DATA 0,2,96,0,12,223,255,246,
     128'BCBI
1650 DATA 0,2,152,7,130,135,224,26,
     176'BDWJ
1660 DATA 15,130,135,128,26,128,63,
     2'BBFK
1670 DATA 112,0,12,31,255,240,0,0,0,0,
     0'BEGL
1680 DATA 0,0,0,0,0,0,0,0,0,0,0,0,
     0'BCTM
1690 DATA 0,255,0,3,0,192,4,60,32,
     8'BAON
1700 DATA 118,16,8,126,16,4,60,32,3,
     0'BCTF
1710 DATA 192,0,255,0,0,0,0,0,0,0,
     0'BCBG
1720 DATA 0,0,0,0,0,0,0,0,0,0,0,
     0'BADH
1730 REM RESET LINKS'BKVG
1740 FOR Q=217 TO 242'DHOH
1750 IF PEEK(Q)<128 THEN POKE Q,
     PEEK(Q)+128'HOKM
1760 NEXT:RETURN'CBXH
1770 FOR X=1 TO 28:PRINT CHR$(192);
     :NEXT:RETURN'HNQO
1780 REM GAME OVER'BIDK
1790 SC=TI:POKE V+21,2'DKSN
1800 PRINT HO$ TAB(33) "[SPACE6]"'CGTE
1810 SYS 49152:POKE 53280,15
     :POKE 53281,1'DWGI
1820 PRINT HO$ LEFT$(CC$,5) RE$'CNAH
1830 GOSUB 1730'BEMF
1840 PRINT TAB(5)RV$CHR$(176);
     :GOSUB 1770'EQLK
1850 PRINT CHR$(174)'CFBI
1860 FOR X=1 TO 9:PRINT
     TAB(5)RV$CHR$(221);'GPHO
1870 PRINT RO$;'BECJ
1880 FOR Y=1 TO 28:PRINT" ";
     :NEXT Y'FIOO
1890 PRINT RV$CHR$(221):NEXT X'DKMO
1900 PRINT TAB(5)RV$CHR$(173);
     :GOSUB 1770'EQIH
1910 PRINT CHR$(189)'CFHF
1920 GOSUB 1730'BEMF
1930 PRINT CHR$(149) LEFT$(CC$,7)'DMQJ
1940 IF SC<=HS THEN HS=SC'FIUL
1950 PRINT TAB(11)"GAME OVER"
     :PRINT'DEYM
1960 PRINT TAB(8)"[SPACE5]
     SCORE="SC'CEUM
1970 PRINT TAB(8)"BEST SCORE="HS'CEWO
1980 PRINT'BACK
1990 PRINT TAB(11)"PRESS FIRE BUTTON
     TO"'CDFS
2000 PRINT TAB(11)"PLAY AGAIN"'CDIX
2010 WAIT J2,127,127:J=PEEK(J2)'DQTA
2020 IF J AND 16 THEN 2050'DHNY
2030 SC=0:SYS 49214'CJIA
2040 POKE 53280,7:POKE 53281,1
     :GOTO 640'DTMD
2050 POKE V+21,0:PRINT CL$:END'EKYD
2060 FOR X=49152 TO 49289:READ Z
     :POKE X,Z:NEXT:RETURN'HTUI
2070 DATA 32,124,192,162,0,189,0,
     4'BYEG
2080 DATA 157,0,193,189,0,5,157,0'BXTG
2090 DATA 194,189,0,6,157,0,195,
     189'BAGI
2100 DATA 0,216,157,0,197,189,0,
     217'BAOA
2110 DATA 157,0,198,189,0,218,157,
     0'BAUB
2120 DATA 199,202,208,217,162,216,
     189'BCBC
2130 DATA 0,7,157,0,196,189,0,219,
     157'BCSD
2140 DATA 0,200,202,208,241,96,32,
     124'BCSE
2150 DATA 192,162,0,189,0,193,157,
     0'BAMF
2160 DATA 4,189,0,194,157,0,5,189'BXEF
2170 DATA 0,195,157,0,6,189,0,197'BXBG
2180 DATA 157,0,216,189,0,198,157,
     0'BASI
2190 DATA 217,189,0,199,157,0,218,
     202'BCSJ
2200 DATA 208,217,162,216,189,0,196,
     157'BESC
2210 DATA 0,7,189,0,200,157,0,219,
     202'BCUC
2220 DATA 208,241,96,162,0,181,
     217'BYOD
2230 DATA 9,128,149,217,232,224,
     25'BYTE
2240 DATA 208,245,96'BKBC
2250 REM SOUND SETUP'BKSE
2260 POKE SD+24,15:POKE SD+5,192'EPWH
2270 POKE SD+6,250:POKE SD+4,0
     :RETURN'FOIJ
2280 REM SHOT'BEEF
2290 POKE SD+24,15:POKE SD+5,9
     :POKE SD+1,20:POKE SD+4,128'IDOQ
2300 POKE SD+6,0'CFFY
2310 POKE SD+4,129:RETURN'DIFB
```

BY MATTHEW OLDHAM

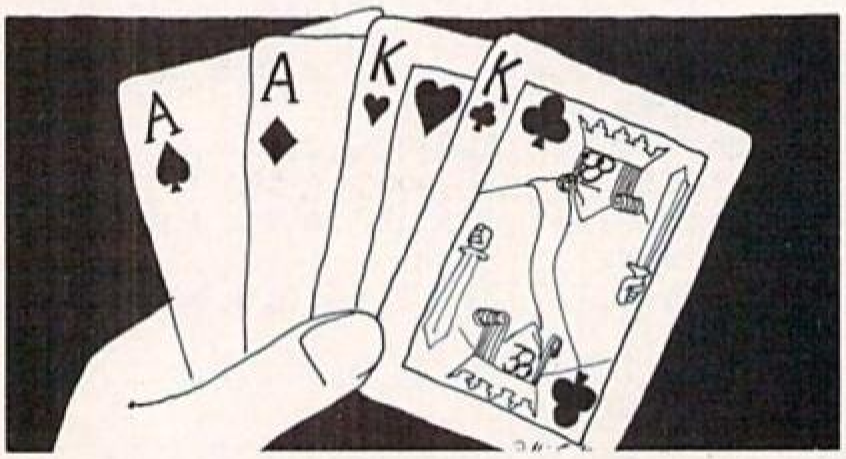
Concentration

A Card Game for the 64

For those who do not know, Concentration is a card game that starts with all 52 cards laid face down on a surface. Then each player, in turn, flips over two of them. If they match (by rank, two aces, two kings, etc...), the player removes them to his win pile and tries two more. If they do not match, they are laid face down once again in the same position, and the turn goes to the next player. The game ends when all the cards have been matched. The player with the most matches wins.

The major difference between the computer game and the card game is that my game allows for solo play against the computer itself! Otherwise they are just the same. Each player chooses two cards, one at a time, by row (1-4) and column (1-13). They are 'turned over' and, if they match, a sound effect occurs and the cards are removed from the screen. If they do not match, they are 'turned down' and the next player begins. The game is ended and the winner determined as in the card game. I hope you enjoy it. ◼

The game ends when all the cards have been matched. The player with the most matches wins.



Concentration

```
100 CLR:RESTORE'CBWV
105 PRINT"[CLEAR,DOWN5,GRAY3]
    "TAB(18)"CONCENTRATION"TAB(48)"(C)
     1984 MATTHEW OLDHAM"'DGCO
110 S=54272:V=53248:POKE V+33,6
    :POKE V+32,14'GBBF
112 DIM X(13),CD(13),UD(4,13),SD(4,
    13)'BFWE
115 FOR I=0 TO 2:POKE 12288+I,0
    :NEXT I'GOVH
120 FOR I=3 TO 62 STEP 3
    :POKE 12288+I,15:POKE 12289+I,255
    :POKE 12290+I,240:NEXT I'LONM
130 POKE 2040,192:POKE 2041,192
    :POKE V+21,3:POKE V+27,3
    :POKE V+39,1:POKE V+40,1'KQUM
135 READ NL$:PL=1264'CKDG
140 PRINT"[DOWN]DO YOU WISH TO PLAY
    AGAINST THE COMPUTER"'BAPK
141 INPUT"(1) OR AGAINST OTHER
    HUMANS(2-10)";NP'BDGJ
150 IF NP<1 OR NP>10 THEN 140'FKSF
160 FOR I=1 TO 3:READ BB$
    :FOR J=1 TO 13:GL$(I)=GL$(I)+BB$
    :NEXT J:NEXT I:READ NM$'MLVQ
170 GL$(4)=GL$(3):GL$(3)=GL$(2)
    :FOR I=1 TO 4:READ Y(I),ST(I),
    BL(I):NEXT I'HXTQ
175 FOR I=1 TO 13:READ X(I),CD(I)
    :NEXT I'FRKN
180 PRINT"[CLEAR,DOWN10]":PRINT NM$
    :FOR I=1 TO 4:FOR J=1 TO 4
    :PRINT GL$(J):NEXT:NEXT'LVHP
190 FOR I=1 TO 4:PL=PL+121'FLFJ
200 FOR J=1 TO 13'DEGX
210 RW=INT(RND(1)*4+1):CL=INT(RND(1)
    *13+1)'KUCI
220 IF UD(RW,CL)=32 THEN 210'DOQD
230 SD(I,J)=CD(CL):UD(RW,CL)=32
    :POKE PL,CD(CL):POKE PL+40,
    ST(RW)'FWQN
240 POKE PL+54272,6:POKE PL+54312,6
    :PL=PL+3'GAMJ
250 NEXT J:NEXT I'CDIC
260 FOR I=1 TO NP'DENE
270 PRINT"[HOME]":FOR J=1 TO 6
    :PRINT NL$:NEXT J'GKFJ
280 PRINT"[HOME,DOWN]PLAYER NUMBER ";
    I,"MATCHES ";PM(I)'BJLM
290 INPUT"PLEASE CHOOSE CARD 1 (ROW,
    COL)";RO(1),CO(1)'BMNP
291 IF RO(1)<1 OR RO(1)>4 OR CO(1)<1
    OR CO(1)>13 THEN 280'JDMS
295 IF SD(RO(1),CO(1))=32 THEN
    PRINT"CARD GONE!":GOTO 280'FVXU
300 IF X(CO(1))>255 THEN POKE V,
    X(CO(1))-256:POKE V+16,
    PEEK(V+16)OR 1:GOTO 310'LOLM
305 POKE V,X(CO(1))'BKNE
310 POKE V+1,Y(RO(1))'CLRB
315 INPUT"PLEASE CHOOSE CARD 2 (ROW,
    COL)";RO(2),CO(2)'BMQN
316 IF RO(2)<1 OR RO(2)>4 OR CO(2)<1
    OR CO(2)>13 THEN 315'JDPQ
320 IF RO(1)=RO(2)AND CO(1)=CO(2)THEN
    PRINT"THEY'RE THE SAME CARD!"
    :GOTO 280'HYMO
325 IF SD(RO(2),CO(2))=32 THEN
    PRINT"CARD GONE!":GOTO 315'FVYO
330 IF X(CO(2))>255 THEN POKE V+2,
    X(CO(2))-256:POKE V+16,
    PEEK(V+16)OR 2:GOTO 340'MPGQ
335 POKE V+2,X(CO(2))'CLDI
340 POKE V+3,Y(RO(2))'CLUE
350 IF SD(RO(1),CO(1))=SD(RO(2),
    CO(2))THEN PM(I)=PM(I)+1:GOSUB 500
    :GOTO 270'HYVR
355 UD(RO(1),CO(1))=SD(RO(1),CO(1))
    :UD(RO(2),CO(2))=SD(RO(2),
    CO(2))'CLJV
360 FOR J=1 TO 2700:NEXT J
    :FOR K=0 TO 3:POKE V+K,0:NEXT K
    :POKE V+16,0:NEXT I'NCWQ
370 IF NP=1 THEN GOSUB 560'EGSH
380 GOTO 260'BDHG
390 IF NP=1 THEN 440'DGYJ
400 HS=1:FOR I=2 TO NP:IF
    PM(I)>PM(HS)THEN HS=I:FL=0
    :GOTO 410'KGHM
405 IF PM(I)=PM(HS)THEN FL=1'EOYJ
410 NEXT I'BBCY
415 IF FL=1 THEN PRINT"[CLEAR,DOWN]
    THERE IS A TIE WITH ";PM(HS);
    " MATCHES":GOTO 430'FPOS
420 PRINT"[CLEAR,DOWN3]
    AND THE WINNER IS PLAYER #";
    HS'BDDI
430 PRINT:PRINT:FOR I=1 TO NP
    :PRINT"PLAYER #";I,PM(I);
    " MATCHES"'GQEM
435 NEXT I:GOTO 470'CFPI
440 IF CM>PM(1)THEN PRINT"[CLEAR,
    DOWN3]I WIN! I WIN! I WIN!"'EHSL
450 IF CM<PM(1)THEN PRINT"[CLEAR,
    DOWN3]RATS! YOU WIN "'EHOL
455 IF PM(1)=CM THEN PRINT"[CLEAR,
    DOWN3]IT'S A TIE!"'EHAP
460 PRINT"[DOWN2]YOU HAVE ";PM(1);
    " MATCHES"TAB(40)"AND I HAVE ";CM;
    " MATCHES"'COMR
470 INPUT"[DOWN]DO YOU WISH ANOTHER
    GAME";AN$'BEON
480 IF AN$="YES"THEN GOTO 100'EGOK
490 END'BACH
500 UD(RO(1),CO(1))=32:UD(RO(2),
    CO(2))=32:SD(RO(1),CO(1))=32'DDJM
505 FOR J=1 TO 1500:NEXT J'EIEI
510 SD(RO(2),CO(2))=32:FOR J=1 TO 2
    :EL(J)=BL(RO(J))+3*CO(J)
    :NEXT J'ITRP
520 POKE S+24,15:POKE S+5,65
    :POKE S+6,136:POKE S+1,57
    :POKE S,172:POKE S+4,17'LMHQ
525 FOR J=0 TO 120 STEP 40
    :FOR K=0 TO 2:POKE EL(1)+J+K,32
    :NEXT K:NEXT J:POKE S+4,16'OHYV
530 POKE S+1,40:POKE S,200
    :POKE S+4,17'FREI
535 FOR J=0 TO 120 STEP 40
    :FOR K=0 TO 2:POKE EL(2)+J+K,32
    :NEXT K:NEXT J:POKE S+4,16'OHAW
540 FOR J=0 TO 3:POKE V+J,0:NEXT J
    :POKE V+16,0'IQXL
545 TM=TM+1:IF TM=26 THEN 390'FNUO
550 RETURN'BAQE
560 PRINT"[HOME]":FOR J=1 TO 6
    :PRINT NL$:NEXT J:PRINT"[HOME,
    DOWN]MY TURN",CM;" MATCHES"'HPBR
```

```
565 FL=FL+1:IF FL/2=INT(FL/2)OR
    PM(1)>11 THEN GOTO 670'LYPW
570 RO(1)=INT(RND(1)*4+1)
    :CO(1)=INT(RND(1)*13+1)'KBBS
575 IF SD(RO(1),CO(1))=32 THEN
    570'DUWR
580 RO(2)=INT(RND(1)*4+1)
    :CO(2)=INT(RND(1)*13+1)'KBDT
590 IF RO(1)=RO(2)AND CO(1)=CO(2)THEN
    580'FXGQ
600 IF SD(RO(2),CO(2))=32 THEN
    580'DUAG
610 IF X(CO(1))>255 THEN POKE V,
    X(CO(1))-256:POKE V+16,
    PEEK(V+16)OR 1:GOTO 620'LOPQ
615 POKE V,X(CO(1))'BKNI
620 IF X(CO(2))>255 THEN POKE V+2,
    X(CO(2))-256:POKE V+16,
    PEEK(V+16)OR 2:GOTO 630'MPIS
625 POKE V+2,X(CO(2))'CLDK
630 POKE V+1,Y(RO(1)):POKE V+3,
    Y(RO(2))'EXPK
640 IF SD(RO(1),CO(1))=SD(RO(2),
    CO(2))THEN CM=CM+1:GOSUB 500
    :GOTO 560'HSBR
645 UD(RO(1),CO(1))=SD(RO(1),CO(1))
    :UD(RO(2),CO(2))=SD(RO(2),
    CO(2))'CLJX
650 FOR J=1 TO 2700:NEXT J
    :FOR K=0 TO 3:POKE V+K,0:NEXT K
    :POKE V+16,0'MARR
660 RETURN'BAQG
670 RO(1)=INT(RND(1)*4+1)
    :CO(1)=INT(RND(1)*13+1)'KBBT
680 IF SD(RO(1),CO(1))=32 THEN
    670'DUXO
690 FOR J=1 TO 4:FOR K=1 TO 13'GISO
700 IF RO(1)=J AND CO(1)=K THEN
    720'FPTH
710 IF SD(RO(1),CO(1))=UD(J,
    K)THEN RO(2)=J:CO(2)=K
    :GOTO 610'GOJO
720 NEXT K:NEXT J'CDKE
730 RO(2)=INT(RND(1)*4+1)
    :CO(2)=INT(RND(1)*13+1)'KBDQ
740 IF SD(RO(2),CO(2))=32 THEN
    730'DUWL
750 IF RO(1)=RO(2)AND CO(1)=CO(2)THEN
    730'FXDO
760 GOTO 610'BDGI
770 DATA"[SPACE38]","[SHFT U,SHFT C,
    SHFT I]","[SHFT B] [SHFT B]","
    [SHFT J,SHFT C,SHFT K]"'BDSU
775 DATA" 1[SPACE2]2[SPACE2]3[SPACE2]
    4[SPACE2]5[SPACE2]6[SPACE2]7
    [SPACE2]8[SPACE2]9[SPACE2]
    10 11 12 13"'BALT
780 DATA 119,65,1341,151,83,1501,183,
    88,1661,215,90,1821'BWPS
790 DATA 24,1,48,11,72,17,96,10,120,
    20,144,57,168,56,192,55'BANU
800 DATA 216,54,240,53,264,52,288,51,
    312,50'BJVJ
```

NO MORE PENCILS

BY DAVID MALMBERG

List Processing in LOGO

This article will introduce the basic concepts of list processing in LOGO. These concepts will be illustrated using several examples including a "buzz word" sentence generator and a LOGO version of the game Mastermind.

This article will introduce the basic concepts of list processing in LOGO.

A Few Definitions

LOGO has three data types: numbers, words and lists. In Commodore LOGO, a *number* may be either floating or fixed point—that is, may or may not have a decimal point. For example, FORWARD 35 would instruct the turtle to go forward 35 steps, and MAKE "PI 3.1416 would assign the value 3.1416 to the variable.

A *word* in LOGO is a string of contiguous characters prefixed by a quotation mark. These characters may be anything except a space or a right or left bracket. As a result, words may be numbers, and it is even possible to have a variable with a name like "3" whose value is 12. There are no (significant) limits on the length of words; so the LOGOphile is allowed to use long and meaningful names for variables or procedure names. For example, MAKE "KING"HENRY.THE.8TH would assign the character string HENRY.THE.8TH to the variable KING.

A LOGO *list* can be any size and can contain any combination of numbers, words, LOGO commands or even other lists as elements. Lists are always shown in square brackets with the individual elements separated by spaces. Several examples: MAKE "DATE [JULY 4 1985], PRINT [THIS IS A LIST OF WORDS], MAKE "ERROR.MESSAGE [YOU TRIED TO DIVIDE BY 0], REPEAT 4 [FORWARD 50 RIGHT 90]. Notice that the words within a list do not need quote marks. One list deserves special mention: the null or empty list. This is a list with no elements and is shown as [ ]. There is a corresponding null or empty word that is shown as a lone quote mark, or ".

Dissecting Words and Lists

LOGO has several tools to enable you to get at the parts of either words or lists:

FIRST	Outputs the first character of a word or the first element of a list. Remember, an element of a list may be a number, a word or another list.
LAST	Outputs the last character of a word or the last element of a list.
BUTFIRST	Outputs everything except the first character of a word or everything except the first element of a list.
BUTLAST	Outputs everything except the last character of a word or everything except the last element of a list.

A few examples:

PRINT FIRST "NOVEMBER will print N

PRINT BUTFIRST "NOVEMBER will print OVEMBER

PRINT FIRST LAST BUTLAST [ONE 2 THREE 4] will print T

When looking at LOGO statements like the above examples, it is important to think about the order of operations as being from the "inside" to the "outside"—not just from left to right as with languages like BASIC. For instance, in the last example the BUTLAST [ONE 2 THREE 4] is the first expression evaluated—and it outputs the list [ONE 2 THREE]. This list is then input for the LAST operation which outputs the word THREE. Then, the FIRST operation is applied to THREE and the letter T is produced as the final output for the entire LOGO command.

Assembling Words and Lists

The converse of dissecting words and lists is to assemble them. LOGO has a number of built-in operations to help you with this assembly process:

FPUT	Takes two inputs, the last of which must be a list. The FPUT operation combines the first input and the second input and outputs the result. For example, FPUT 1 [2 3 4] would output [1 2 3 4]. FPUT is the complementary operation of FIRST.
LPUT	LPUT is similar to FPUT except it puts its first input at the end of the second input list, rather than in front. For example, LPUT 4 [1 2 3] would output the list [1 2 3 4]. LPUT is the complement of LAST.
WORD	WORD takes two or more words as inputs and concatenates them into a single word. For example, WORD "CAT "S would output a single word CATS. If WORD has more than two inputs, everything must be enclosed within parentheses. For instance, (WORD "ABC "DE "FG "HIJ) would create a single word ABCDEFGHIJ.
LIST	LIST is similar to WORD except it outputs a single list made from its inputs. For example, LIST "A [B C] would output the list [A [B C]]. Notice that LIST's inputs may be either words or lists and their status as words or lists is preserved in the output list. If LIST has more than two inputs, everything must be enclosed within parentheses.
SENTENCE	SENTENCE is very much like LIST except none of the input lists are preserved as lists in the output. For example, SENTENCE

"A [B C] would output a single list consisting only of separate words [A B C]. Compare how LIST would handle this same example. If SENTENCE has more than two inputs, everything must be enclosed within parentheses. For example, (SENTENCE "A [B C] [D E F]) would output the single list [A B C D E F].

Other Word and List Operations

LOGO has a number of built-in functions to test the status of words and lists and return a TRUE or FALSE depending upon the results of the test:

NUMBER?	Outputs a TRUE if the input is a number and a FALSE otherwise. For example, NUMBER? :A would output a TRUE if the current value of the entity named A is a number.
WORD?	Outputs a TRUE if the input is a word and a FALSE otherwise. For example, WORD? "ABC would output a TRUE. Since numbers are treated by LOGO just like words, WORD? will also output a TRUE if its input is a number.
LIST?	Outputs a TRUE if its input is a list and a FALSE otherwise.
EMPTY?	Outputs a TRUE if the input is an empty word (i.e., a lone ") or if the input is an empty list (i.e., [ ]).
MEMBER?	Takes two inputs and outputs a TRUE if the first input is contained in the second input. For example, MEMBER? "A "ABILITY would input a TRUE, or MEMBER? 3 [1 2 3] would output a TRUE.

MEMBER? can be helpful in writing your own logical tests. For example, you could write a procedure called VOWEL? which would test if a letter was a vowel and output TRUE or FALSE accordingly:

```
TO VOWEL? :LETTER
  OUTPUT MEMBER? :LETTER [A E I O U]
END
```

LOGO also has a function that enables you to determine the length of a word or list and a function that enables you to select a specific element of a list—other than the FIRST or LAST.

COUNT	If the input is a word or number, COUNT outputs the number of characters it contains. If the input is a list, COUNT outputs the number of elements in the list. For example, COUNT [1 2 THREE [A B C]] would output a four. Notice that [A B C] is counted as a single element of the list.
ITEM	ITEM takes two inputs (a number and a list) and outputs the element of the list corresponding to the number. For example, ITEM 3 [A B C D] would output the element C.

COUNT and ITEM can be used to write a procedure to output a randomly selected element of a list as follows:

```
TO SELECT.RANDOM :LIST
  OUTPUT ITEM ( 1 + RANDOM ( COUNT :LIST ) )
    :LIST
END
```

The LOGO function RANDOM takes a single integer (for example, N) as input and outputs a random integer between zero and N-1. So, working from the "inside" to the "outside" in the above procedure, RANDOM (COUNT :LIST) would output a random number between zero and one less than the number of elements in :LIST. This number would have one added to it and the result used as the first input to ITEM with :LIST as the second input. The procedure would then output a random element of :LIST.

The program in Listing 1 uses SELECT.RANDOM to generate sentences composed of random "buzz words." Each sentence takes the form: Article, Noun, Verb, Article, Adjective, Adjective, Noun. Here are a few typical sentences that the program generated:

```
The joystick is a modular educational servomechanism.
The data base obscurates the holistic cybernetic
  paradigm.
```

The program in Listing 1 also uses the VOWEL? testing procedure described previously to use the articles "a" and "an" properly.

Recursive List Processing Procedures

By far the most powerful and useful tool for handling lists is LOGO's ability to process procedures recursively. This is best illustrated by example. The procedure below will output the total of a list of numbers.

```
TO TOTAL :NUMBERS
  IF :NUMBERS = [ ] THEN OUTPUT 0
  OUTPUT ( FIRST :NUMBERS ) + TOTAL BUTFIRST
    :NUMBERS
END
```

After defining this procedure, you could use it in another LOGO statement such as PRINT TOTAL [1 2 3] to print the total of six. When LOGO first encounters the expression TOTAL [1 2 3], it calls the TOTAL procedure with the initial value of the list NUMBERS equal to [1 2 3]. Once inside the TOTAL procedure, the second statement tests if the current list of NUMBERS is empty. Since it is not empty, control passes to the next statement which outputs the first element of the current list (i.e., 1) *plus* the output of TOTAL BUTFIRST :NUMBERS (i.e., TOTAL [2 3].

The call to a procedure (i.e., TOTAL) from within that same procedure is what is meant by the term *recursion*. The TOTAL procedure is then executed a second time with the list NUMBERS as [2 3]—which is not empty—so program control again passes to the third statement which then outputs the current first element (i.e., 2) *plus* TOTAL [3]. The third time the procedure is element (i.e., 2) *plus* TOTAL [3].—which is the same as TOTAL [ ] since the BUTFIRST of a list with only one element is empty. The fourth and last time TOTAL is called the test for an empty list in the second line is TRUE and a zero is the final output.

It is important to see that this recursive process has produced a single output which is the sum of one plus two plus three plus zero. The sum, six, is the only number that is printed by the original calling PRINT statement.

Once the TOTAL procedure is defined, it is easy to write a procedure to calculate the average of a list of numbers by using TOTAL and LOGO's COUNT function as:

```
TO AVERAGE :NUMBERS
   OUTPUT ( TOTAL :NUMBERS ) / COUNT :NUMBERS
END
```

Here is another example of a list processing procedure. This procedure takes a list as input and outputs that list in reverse order:

```
TO REVERSE :LIST
   IF :LIST = [ ] THEN OUTPUT [ ]
   OUTPUT FPUT LAST :LIST REVERSE BUTLAST
      :LIST
END
```

The second line of the procedure tests if the current value of LIST is empty and, if it is, outputs an empty list. This logic is called a *stopping condition* because it causes the recursive calls to the procedure to stop if the condition is TRUE. Most LOGO list processing procedures will have a stopping condition similar to (and in many cases identical to) line two above. If LIST is not empty, line three outputs the last element of the current LIST followed by a list produced by a recursive call to REVERSE but with a new input list made up of the current LIST without its last element. Try thinking through an example of a call to REVERSE with the initial input list [1 2 3] and you should be able to see how the procedure will output [3 2 1] and then output a [ ] and stop.

This format for a recursive list-processing procedure is quite typical and you will see it often in LOGO. A more general way to visualize this format is as follows:

Line 1: Title with its inputs including one or more lists.
Line 2: Test one of the inputs for a stopping condition and produce the last output if condition is met to stop.
Line 3: Test first element of one of the input lists for condition representing overall purpose of the procedure.
Line 4: If TRUE, output appropriate true value (if any) followed by a recursive call with BUTFIRST on one or more of the input lists.
Line 5: If FALSE, output appropriate false value (if any) followed by a recursive call with BUTFIRST on one or more of the input lists.
Line 6: End.

You will find this general format very helpful to remember as you try to develop your own LOGO list-processing procedures.

LOGO Mastermind

Listing 2 is a version of the popular logic game Mastermind written in LOGO. The procedure entitled (aptly) INSTRUCTIONS explains how the game is played. This game has numerous recursive list-processing procedures. As you key in the game, study each of the procedures to understand just what it is doing and how it is doing it. You should learn a great deal about LOGO list processing and hopefully you will enjoy the game more knowing how it works. ◼

Listing 1. Buzz Words

```
 O BUZZ.SENTENCES
     ARTICLES
     VERBS
     NOUNS
     ADJECTIVES
     REPEAT 10 [NONSENTENCE]
END

TO ARTICLES
     MAKE "ARTICLE [A THE]
END

TO VERBS
     MAKE "VERB [IS WAS CREATES CAUSES UNBUNDLES OBSCURATES
         DEGRADES INTERLEAVES DIFFUSES SIMULATES IDEALIZES
         IMAGES PROCESSES DEBUGS ITERATES PROGRAMS
         DISAGGREGATES STRUCTURES DISINFORMS STRATIFIES
         DIFFERENTIATES CONTINUES MODELS]
END

TO NOUNS
     MAKE "NOUN [ALGORITHM INTERFACE ENVIRONMENT PSEUDO-CODE BUG
         JOYSTICK BIT-TWIDDLE DATA-BASE FIRMWARE KLUGE HACKER
         META-LANGUAGE MEMORY-DUMP SERVOMECHANISM THRESHOLD
         PARADIGM INFRASTRUCTURE SCENARIO EXTERNALITY MODEL
         MEGA-SYSTEM MICROCOMPUTER SIMULATION]
END

TO ADJECTIVES
     MAKE"ADJECTIVE [DIFFERENTIATED FLEXIBLE MODULAR HEURISTIC
         USER-FRIENDLY REAL-TIME CONCURRENT FAIL-SAFE CYBERNETIC
         SYNOPTIC OPTIMAL EUPHEMANTIC STOCHASTIC XENOPHOBIC
         ARTIFICIAL CONTINUOUS BIT-MAPPED ARISTOTELIAN
         STRATIFIED COGNITIVE INTEGRATED EDUCATIONAL
         HETEROGENEOUS DIFFUSED HOMOGENEOUS HUMANISTIC
         SOPHISTICATED INTELLIGENT HOLISTIC MULTI-MODAL]
END

TO NONSENTENCE
     MAKE "NOUN1 SELECT.RANDOM :NOUN
     MAKE "NOUN2 SELECT.RANDOM :NOUN
     IF :NOUN1 = :NOUN2 THEN MAKE "NOUN2 SELECT.RANDOM :NOUN
     MAKE "ADJECTIVE1 SELECT.RANDOM :ADJECTIVE
     MAKE "ADJECTIVE2 SELECT.RANDOM :ADJECTIVE
     IF :ADJECTIVE1 = :ADJECTIVE2 THEN MAKE "ADJECTIVE2
         SELECT.RANDOM :ADJECTIVE
     MAKE "ARTICLE1 SELECT.RANDOM :ARTICLE
     MAKE "ARTICLE2 SELECT.RANDOM :ARTICLE
     IF ALLOF ( :ARTICLE1 = "A ) ( VOWEL? FIRST FIRST :NOUN1 )
         THEN MAKE "ARTICLE1 "AN
     IF ALLOF ( :ARTICLE2 = "A ) ( VOWEL? FIRST FIRST :ADJECTIVE1 )
         THEN MAKE "ARTICLE2 "AN
     ( PRINT :ARTICLE1 :NOUN1 SELECT.RANDOM :VERB :ARTICLE2
         :ADJECTIVE1 :ADJECTIVE2 :NOUN2 )
END

TO SELECT.RANDOM :LIST
     OUTPUT ITEM ( 1 + RANDOM ( COUNT :LIST ) ) :LIST
END

TO VOWEL? :LETTER
     OUTPUT MEMBER? :LETTER [ A E I O U]
END
```

Listing 2. Mastermind

```
TO MASTERMIND
     CLEARTEXT
     CURSOR 11 1 PRINT [LOGO MASTERMIND]
     CURSOR 10 3 PRINT [BY DAVID MALMBERG]
     CURSOR 6 5 PRINT [CRACK LOGO'S SECRET CODE]
     CURSOR 11 7 PRINT1 [INSTRUCTIONS ?] MAKE "KEY
          FIRST.LETTER
     IF :KEY = "Y THEN INSTRUCTIONS
     CLEARTEXT
     PRINT1 [ENTER NUMBER OF POSSIBLE LETTERS:] MAKE
          "NLETTERS FIRST REQUEST
     IF :NLETTERS > 11 THEN MAKE "NLETTERS 11
     IF :NLETTERS < 6 THEN MAKE "NLETTERS 6
     PRINT []
     PRINT1 [ENTER NUMBER OF LETTERS IN CODE:] MAKE "NCODE
          FIRST REQUEST
     IF :NCODE < 2 THEN MAKE "NCODE 2
     IF :NCODE > 6 THEN MAKE "NCODE 6
     MAKE "N POWER :NLETTERS :NCODE
     PRINT []
     ( PRINT [THERE ARE] :N [POSSIBLE CODES!] )
     PRINT []
     PRINT1 [HIT RETURN TO START] MAKE "KEY FIRST.LETTER
     GAME
END

TO INSTRUCTIONS
     CLEARTEXT
     PRINT [IN LOGO MASTERMIND, YOU TRY TO FIGURE]
     PRINT [OUT A SECRET CODE MADE UP OF SEVERAL]
     PRINT [UNKNOWN CHARACTERS. YOU GET TO SPECIFY]
     PRINT [THE NUMBER OF CHARACTERS IN THE CODE]
     PRINT [FROM TWO TO SIX. YOU ALSO GET TO SET]
     PRINT [THE NUMBER OF POSSIBLE LETTER'S THAT]
     PRINT [COULD BE SELECTED FOR ANY INDIVIDUAL]
     PRINT [CHARACTER IN THE CODE -- UP TO ELEVEN.]
     PRINT [] PRINT [FOR EXAMPLE, IF YOU SET THE CODE TO 5]
     PRINT [CHARACTERS AND THE POSSIBLE LETTERS TO]
     PRINT [9, YOU WOULD TRY TO CRACK A CODE]
     PRINT [SEQUENCE LIKE XXXXX, WHERE ANY OF THE]
     PRINT [X'S COULD BE ONE OF THE LETTERS A, B,]
     PRINT [C, D, E, F, G, H OR I.]
     PRINT []
     PRINT [THE NUMBER OF POSSIBLE CODE SEQUENCES]
     PRINT [IS EQUAL TO THE NUMBER OF CHARACTERS]
     PRINT [IN THE CODE. IN THE EXAMPLE ABOVE, THE]
     PRINT [NUMBER OF CODES IS 9 TO THE 5-TH POWER]
     PRINT [OR 59049]
     PRINT []
     PRINT1 [HIT RETURN TO CONTINUE] MAKE "KEY FIRST.LETTER
     CLEARTEXT PRINT [AFTER YOU ENTER YOUR GUESSES FOR THE]
     PRINT [CODE, YOU WILL BE TOLD THE NUMBER OF MATCHES
          THAT ARE CORRECT --]
     PRINT [I.E., WHERE BOTH THE LETTER AND THE]
     PRINT [POSITION WITHIN THE CODE ARE CORRECT.]
     PRINT [SECOND, YOU WILL BE TOLD THE NUMBER OF]
     PRINT [LETTERS CORRECT BUT IN THE WRONG]
          PRINT [POSITIONS.] PRINT []
          PRINT1 [HIT RETURN TO CONTINUE] MAKE "KEY FIRST.LETTER
END

TO FIRST.LETTER
     COMMENT [OUTPUTS THE FIRST LETTER OF KEYBOARD INPUT]
     MAKE "IMAGE REQUEST
     IF :IMAGE = [] OUTPUT []
     OUTPUT FIRST FIRST :IMAGE
END

TO POWER :X :Y
     COMMENT [OUTPUTS :X TO THE POWER OF :Y]
     IF :Y = 0 THEN OUTPUT 1
     OUTPUT :X * POWER :X :Y - 1
END

TO GAME
     CLEARTEXT
     MAKE "LETTERS MAKE.LIST "ABCDEFGHIJKL
     MAKE "LETTERS OUTPUT.TO.POS :NLETTERS :LETTERS
     MAKE "CODE [] MAKE.CODE :NCODE
     MAKE "TRY 0
     ( PRINT [POSSIBLE LETTERS:] :LETTERS )
     GET.GUESS
END

TO MAKE.LIST :WORD
     COMMENT [OUTPUTS A LIST CONSISTING OF THE LETTERS OF :WORD]
     IF :WORD = " THEN OUTPUT []
     OUTPUT SENTENCE FIRST :WORD MAKE.LIST BUTFIRST :WORD
END

TO OUTPUT.TO.POS :K :LIST
     COMMENT [OUTPUTS THE FIRST :K ELEMENTS OF :LIST]
     IF :K = 0 THEN OUTPUT []
     OUTPUT FPUT FIRST :LIST OUTPUT.TO.POS ( :K   1 )
          BUTFIRST :LIST
END

TO MAKE.CODE :N
     IF :N = 0 THEN STOP
     MAKE "X SELECT.RANDOM :LETTERS
     MAKE "CODE LPUT :X :CODE
     MAKE.CODE :N - 1
END

TO GET.GUESS
     .GCOLL
     CURSOR 0 23 BLANKS
     CURSOR 0 23 PRINT1 [ENTER GUESS:] MAKE "GUESS MAKE.LIST
          FIRST REQUEST
     IF NOT ( COUNT :GUESS ) = :NCODE THEN ERROR 1
     MAKE "TRY 1 + :TRY
     MAKE "G :GUESS
     MAKE "C :CODE
     MAKE "BLACK MATCHES :G :C
     ELIMINATE.MATCHES :NCODE
```

USER GROUPS

Commodore user groups nationwide and around the world provide invaluable assistance to Commodore computerists. If you are looking for people who share your computing interests, or if you need help getting started with your computer, contact the group near you.

This list is compiled from groups who responded to a survey conducted by Pete Baczor, Commodore's user group coordinator. If you would like your group to appear here, or if you need information about Commodore's user group support, contact Pete at Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380.

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User Group Support Program

Commodore is creating a program to support Commodore User Groups.

The two major components—an electronic bulletin board on CompuServe and a newsletter are now available.

The electronic bulletin board is a dedicated section of the Commodore Information Network of CompuServe accessible only by "Approved" User Groups. It will be used for direct communication as well as Commodore announcements.

The newsletter, INPUT/OUTPUT, will include announcements, user group programs, calender of events, letters, questions, product specifications, programs, and surveys. It will be a newsletter FOR user groups BY user groups supported by Commodore without advertisements.

For future issues of the newsletter Commodore is accepting announcements of user group activities, articles of interest, letters to the editor, and general questions. Please forward all correspondence with the name of your user group to:

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West Chester, PA 19380
Attn: Mario Eisenbacher
Editor, INPUT/OUTPUT

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cabin until a clue appears in the message window or the message "you find nothing" pops up), the passengers provide the most food for thought. Until you really get taken up by the adventure, in fact, the passengers provide the most frustration too. They wander about from cabin to cabin, getting in your way as you search for material clues. If your character image bumps into a passenger in one of those crowded staterooms, then the search for clues must start over. Meanwhile that clock keeps ticking. . .

Bumping into a passenger can also begin an interrogation if you wish. Each detective has a unique set of approaches to questioning the other passengers. For example, Jethro Knight can be forceful, seductive, friendly, polite or naive in his questions. Although you can't ask about a particular *thing*, you may try to elicit some response about another passenger. This can reveal the relations between passengers, sometimes by rumor or "the grapevine." Of course, it is possible to directly seek tidbits about the deceased.

The methods for solving the crime are simple, but the entangling plots make daytime soap operas seem simple.

The passengers are as flightly as they are klutzy, however. Many times they are evasive or downright confusing. They might consent to answering as many as three questions before sauntering off. All the rules about questioning (plus a few more) make the mystery realistic, challenging, and a real pain in the neck. While the avid game player takes rules in stride, the amateur detective (or murder mystery fan) will have their hands full.

Take, for example, the number of passengers. There are 15 left after the murder. That means a fantastic number of combinations or murderee, murderer and motive. It simply boggles the mind. It is virtually impossible to make a rough guess and accuse the correct culprit.

Both adventure and mystery fans will appreciate the characterization and historical background presented by the game. True insight into the passengers' motives and obscure statements can be gleaned from a close reading of the manual's short notes on the 1930's time period and the passenger descriptions. After the first few tries at out-guessing the program, the characters' names will become familiar as well.

Understanding the history represented by the game is really the core of a good adventure. And this is a very good adventure. Although the graphics aren't fantastic, it is amazing how the plot hangs together. But most of all, there's always the opportunity to reach the pinnacle of detective ratings, "Super Sleuth"—if you can quickly manage to unravel the mystery of the *Murder on the Zinderneuf*. C

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Also Included: **ReportGen, ReportMerge** (interface W/P with Database to create form letters, statements, invoices, mailing labels, other reports.); **Baseball Statistician** (compiles batting statistics for a baseball league); several W/P utilities, including **Index** (indexes W/P's text files); several Database utilities, including **DBmerge** (facilitates multi-file database applications.), AND **DBStat** (analyzes D/B files); a programming utility, **ASCII,** which converts text files (program listings) into program files; also **Checkbook**; **Inventory**; **Paper Route**; **Loan Analysis**; **Breakeven Analysis**; **Depreciation**; **Labeler**; more.

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HOW TO ENTER PROGRAMS in *Power/Play*

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the 'wrong' line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

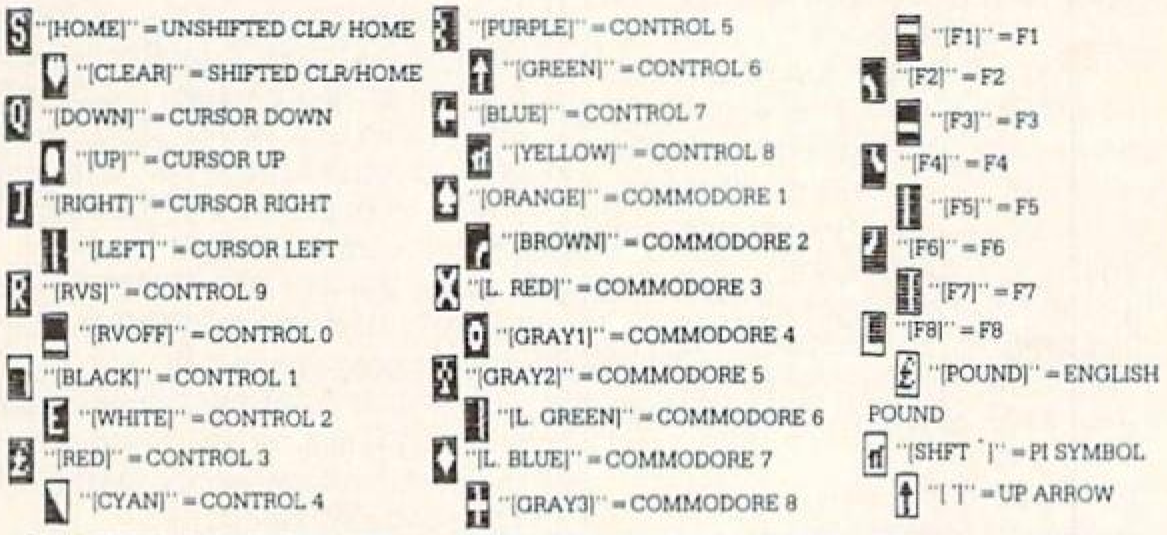
OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when

CHART OF SPECIAL CHARACTER COMMANDS



"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[↑]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

HOW TO CONT'D

you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is 'running'. Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing

Send your questions to:

Power/Play Magazine
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

C

How to Use the Magazine Entry Program

The Magazine Entry Program on page ____ is a machine language program that will assist you in entering the programs in this magazine correctly. It is for use with the Commodore 64 only and was written by Mark Robin using the IEA Editor/Assembler. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 50052, and just lets you know that the program is running. If everything is ok, the program will finish running and end. Then type NEW. If there is a problem with the data statements, the program will tell you where to look to find the problem.

Once the program has run, it is in memory ready to go. To activate the program, type SYS49152 and press RETURN. When the READY prompt is displayed, type TEST and press RETURN. You are now ready to enter the programs from the magazine.

Typing the Programs

All the program listings in this magazine that are for the 64 have an apostrophe followed by four letters at the end of the line (i.e., 'ACDF). The apostrophe and letters *should* be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it *does not* enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are six error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

PARENTHESIS: This means that you forgot (or added) a parenthesis somewhere in the line. Check the line in the magazine again and correct the parenthesis.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT..) incorrectly. Check the line in the magazine again and check your spelling.

# OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word mispelled. Check the line in the magazine again and correct the mistake.

C

Magazine Entry Program

```
1 PRINT "[CLEAR]POKING-";
5 P=49152 :REM $C000
10 READ A$:IF A$="END"THEN 80
20 L=ASC(MID$(A$,2,1))
30 H=ASC(MID$(A$,1,1))
40 L=L-48:IF L>9 THEN L=L-7
50 H=H-48:IF H>9 THEN H=H-7
60 PRINT"[HOME,RIGHT12]"P;
70 B=H*16+L:POKE P,B:T=T+B:P=P+1
   :GOTO 10
80 IF T<>103233 THEN PRINT"MISTAKE IN
   DATA --> CHECK DATA STATEMENTS":END
90 PRINT"DONE":END
1000 DATA 4C,23,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,00,00,0D
1002 DATA 00,58,C1,5E,C1,66,C1,76
1003 DATA C1,83,C1,8F,C1,EA,EA,EA
1004 DATA 4C,83,C0,A2,05,BD,1D,C0
1005 DATA 95,73,CA,10,F8,60,A0,02
1006 DATA B9,00,02,D9,3C,C1,D0,0B
1007 DATA 88,10,F5,A9,01,8D,10,C0
1008 DATA 4C,1F,C1,60,A0,03,B9,00
1009 DATA 02,D9,38,C1,D0,E0,88,10
1010 DATA F5,A9,00,8D,10,C0,4C,1F
1011 DATA C1,60,A0,03,B9,00,02,D9
1012 DATA 34,C1,D0,E0,88,10,F5,A0
1013 DATA 05,B9,A2,E3,99,73,00,88
1014 DATA 10,F7,A9,00,8D,18,D4,4C
1015 DATA 1F,C1,E6,7A,D0,02,E6,7B
1016 DATA 4C,79,00,A5,9D,F0,F3,A5
1017 DATA 7A,C9,FF,D0,ED,A5,7B,C9
1018 DATA 01,D0,E7,20,5A,C0,AD,00
1019 DATA 02,20,A3,C0,90,DC,A0,00
1020 DATA 4C,EA,C1,C9,30,30,06,C9
1021 DATA 3A,10,02,38,60,18,60,C8
1022 DATA B1,7A,C9,20,D0,03,C8,D0
1023 DATA F7,B1,7A,60,18,C8,B1,7A
1024 DATA F0,35,C9,22,F0,F5,6D,05
1025 DATA C0,8D,05,C0,AD,06,C0,69
1026 DATA 00,8D,06,C0,4C,BD,C0,18
1027 DATA 6D,07,C0,8D,07,C0,90,03
1028 DATA EE,08,C0,EE,0B,C0,60,18
1029 DATA 6D,0A,C0,8D,0A,C0,90,03
1030 DATA EE,09,C0,EE,0C,C0,60,0A
1031 DATA A8,B9,11,C0,85,FB,B9,12
1032 DATA C0,85,FC,A0,00,A9,12,20
1033 DATA D2,FF,B1,FB,F0,06,20,D2
1034 DATA FF,C8,D0,F6,20,54,C3,20
1035 DATA 7E,C3,20,E4,FF,F0,FB,A0
1036 DATA 1B,B9,3F,C1,20,D2,FF,88
1037 DATA 10,F7,68,68,A9,00,8D,00
1038 DATA 02,4C,74,A4,4B,49,4C,4C
1039 DATA 54,45,53,54,41,44,44,91
1040 DATA 91,0D,20,20,20,20,20,20
1041 DATA 20,20,20,20,20,20,20,20
1042 DATA 20,20,20,20,20,20,91,0D
1043 DATA 51,55,4F,54,45,00,4B,45
1044 DATA 59,57,4F,52,44,00,23,20
1045 DATA 4F,46,20,43,48,41,52,41
1046 DATA 43,54,45,52,53,00,55,4E
1047 DATA 49,44,45,4E,54,49,46,49
1048 DATA 45,44,00,4E,4F,20,43,48
1049 DATA 45,43,4B,53,55,4D,00,50
1050 DATA 41,52,45,4E,54,48,45,53
1051 DATA 49,53,00,C8,B1,7A,D0,FB
1052 DATA 84,FD,C0,09,10,03,4C,C7
1053 DATA C1,88,88,88,88,88,B1,7A
1054 DATA C9,27,D0,13,A9,00,91,7A
1055 DATA C8,A2,00,B1,7A,9D,3C,03
1056 DATA C8,E8,E0,04,D0,F5,60,4C
1057 DATA F2,C2,A0,00,B9,00,02,99
1058 DATA 40,03,F0,F2,C8,D0,F5,A0
1059 DATA 00,B9,40,03,F0,E8,99,00
1060 DATA 02,C8,D0,F5,20,D7,C1,4C
1061 DATA 56,C2,A0,0B,A9,00,99,03
1062 DATA C0,8D,3C,03,88,10,F7,A9
1063 DATA 80,85,02,20,1B,C3,A0,00
1064 DATA 20,9B,C1,20,CA,C1,20,31
1065 DATA C2,E6,7A,E6,7B,20,7C,A5
1066 DATA A0,00,20,AF,C0,F0,CD,24
1067 DATA 02,F0,06,20,D7,C0,4C,12
1068 DATA C2,C9,22,D0,06,20,BC,C0
1069 DATA 4C,12,C2,20,E7,C0,4C,12
1070 DATA C2,A0,00,B9,00,02,20,A3
1071 DATA C0,C8,90,0A,18,6D,09,C0
1072 DATA 8D,09,C0,4C,33,C2,88,A2
1073 DATA 00,B9,00,02,9D,00,02,F0
1074 DATA 04,E8,C8,D0,F4,60,18,AD
1075 DATA 0B,C0,69,41,8D,0B,C0,38
1076 DATA AD,0C,C0,E9,19,90,06,8D
1077 DATA 0C,C0,4C,60,C2,AD,0C,C0
1078 DATA 69,41,8D,0C,C0,AD,05,C0
1079 DATA 6D,07,C0,48,AD,06,C0,6D
1080 DATA 08,C0,8D,0E,C0,68,6D,0A
1081 DATA C0,8D,0D,C0,AD,0E,C0,6D
1082 DATA 09,C0,8D,0E,C0,38,E9,19
1083 DATA 90,06,8D,0E,C0,4C,96,C2
1084 DATA AD,0E,C0,69,41,8D,0E,C0
1085 DATA AD,0D,C0,E9,19,90,06,8D
1086 DATA 0D,C0,4C,AB,C2,AD,0D,C0
1087 DATA 69,41,8D,0D,C0,A0,01,AD
1088 DATA 0B,C0,CD,3C,03,D0,20,C8
1089 DATA AD,0C,C0,CD,3D,03,D0,17
1090 DATA C8,AD,0D,C0,CD,3E,03,D0
1091 DATA 0E,AD,0E,C0,CD,3F,03,D0
1092 DATA 06,20,64,C3,4C,7A,C0,AD
1093 DATA 10,C0,D0,11,98,48,68,4C
1094 DATA F7,C0,AD,10,C0,F0,01,60
1095 DATA A9,04,4C,F7,C0,A4,FD,A9
1096 DATA 27,91,7A,A2,00,C8,BD,0B
1097 DATA C0,91,7A,C8,E8,E0,04,D0
1098 DATA F5,A9,00,91,7A,20,64,C3
1099 DATA 4C,7A,C0,A0,00,B9,00,02
1100 DATA F0,11,C9,28,D0,03,EE,03
1101 DATA C0,C9,29,D0,03,EE,04,C0
1102 DATA C8,D0,EA,AD,03,C0,CD,04
1103 DATA C0,D0,01,60,A9,05,4C,F7
1104 DATA C0,A9,20,8D,00,D4,8D,01
1105 DATA D4,A9,09,8D,05,D4,A9,0F
1106 DATA 8D,18,D4,60,20,41,C3,A9
1107 DATA 81,20,77,C3,A9,80,20,77
1108 DATA C3,4C,71,C3,20,41,C3,A9
1109 DATA 11,20,77,C3,A9,10,20,77
1110 DATA C3,A9,00,8D,04,D4,60,8D
1111 DATA 04,D4,A2,70,A0,00,88,D0
1112 DATA FD,CA,D0,FA,60,END
```

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nicely. Your job is to initiate the action and move your players through the motions. How well and to what extent the task is carried out is up to that particular star's skill.

You might move your player into the hole to snag a sharply hit ball, but he can still boot it. You might hit a solid single into left, but your speed can stretch it into a two-bagger. It's all part of the game—you're only as good as the players you lead.

Invariably, there will be a large enough minority who will feel cheated, because they either can't perfect the joystick's movement or they choose not to. For these managers, Epyx has two solutions.

Either sharpen your spikes by practicing some solo shots against the computer or turn to the flip side of your disk for a statistical game. But this contest, although enjoyable, doesn't have the depth of other strategy simulations. The real fun is in combining strategy with player control. It's innovative and fun.

There you have it. A proud starting lineup which highlights the year-round 64 baseball season—one which offers something for everyone.

Hardcore action and statistical fans will swing toward Gamestar and SSI, respectively. Both are solid packages, providing all the thrills and requiring all the skills needed to conquer the dusty diamond.

And for those of you who might enjoy a sampling from both sides of the plate, go with Epyx. What it lacks in depth, it more than makes up for with performance.

Now that we've covered all the bases, what are you waiting for? Play ball!

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Gamestar
1302 State Street
Santa Barbara, CA 93101

JIM BUTTERFIELD

Continued from pg. 8

program to tape or disk and bring it back later.

Conclusion

Why write an imposssible program? The first draft we wrote worked fine. All that extra work did not make the program faster or more compact. It didn't run better and is now much harder to change.

Some people, however, like to write "clever" programs. This is certainly one to baffle your friends. But sometimes you'll get caught with tricks like this. If you need to update the program you've given yourself a tough job.

Nevertheless, it does give you an insight into the inner workings of the computer. It's interesting to look at the last line—NEXT NEXT—and then snoop into the inner workings to see how the computer distinguishes between a command and a variable name.

**Note: the POKE addresses given may not be correct for your machine. An extra space—or a missing one—can change the value of the address that you will need to use. Be sure to use the search loop (FOR J=A TO B...) to get the correct addresses for your program.

On the PET/CBM, addresses will be about 1024 lower than those given. On unexpanded Plus/4 and Commodore 16, addresses will be about 2048 higher. Use the search loop to get the exact values for your POKE's.

There's another way of creating this impossible program that is simpler, although it doesn't give you the same insight into how things work.

Here's how to do it: Everywhere you have something that looks like a keyword, but isn't, break it up with a shifted-space character. The input routine will throw away these shifted spaces . . . but only after it has picked out the keywords. So NE(shifted space)XT will end up as NEXT (four letters) and not as NEXT the keyword.

You type a shifted space by holding down the SHIFT key and pressing the SPACE bar. What you get on the screen looks exactly like space, but it isn't a space. It's a shifted space and will disappear after entry. Spaces within a BASIC line won't disappear unless they are at the start or end of the line. Shifted spaces will always disappear unless they are within quotation marks.

Since a shifted space looks exactly like a regular space, a conventional listing would be difficult to type—you couldn't tell the spaces apart. To help, consult Listing 4. Wherever a shifted space will do the trick, the program listing will show [ss]. DO NOT type the characters; type a shifted space.

After you have entered the program above, complete with shifted spaces, list it. You'll find that the shifted spaces have disappeared, and you'll have the impossible program as shown at the beginning of this article.

A little study of the listing above will reveal how the shifted spaces "break up" unwanted keywords such as NEXT, OR, or INT.

By the way, almost any shifted character—a graphic, for example—will do the same trick as a shifted space.

Listing 1.

```
100 INPUT"PRIMES UP TO WHAT VALUE";P
110 PRINT 2:PRINT 3
120 S=5:PIN=3
130 FOR NEXT = STOP STEP 2
140 FOREST = PINTO NEXT STEP 2
150 FORD = NEXT/EST
160 IF FOR=INT(FOOL) GOTO 190
170 IF FORGE>ESSO THEN NEXT
180 PRINT NEXT
190 NEXT NEXT
```

Listing 2.

```
100 INPUT"PRIMES UP TO WHAT VALUE";P
110 PRINT 2:PRINT 3
120 V=5:PZN=3
130 FOR NWXT = VTOP STEP 2
140 FOREST = PZNTO NWXT STEP 2
150 FYRD = NWXT/EST
160 IF FYR=INT(FYOL) GOTO 190
170 IF FYRGE>ESSO THEN NEXT
180 PRINT NWXT
190 NEXT NWXT
```

Listing 3.

```
100 INPUT"PRIMES UP TO WHAT VALUE";P
110 PRINT 2:PRINT 3
120 V=5:PZN=3
130 FOR NEXT = VTOP STEP 2
140 FOREST = PZNTO NEXT STEP 2
150 FYRD = NEXT/EST
160 IF FYR=INT(FYOL) GOTO 190
170 IF FYRGE>ESSO THEN NEXT
180 PRINT NEXT
190 NEXT NEXT
```

Listing 4.

```
100 INPUT"PRIMES UP TO WHAT VALUE";P
110 PRINT 2:PRINT 3
120 S=5:PIN=3
130 FOR NE[ss]XT=S[ss]TOP STEP 2
140 FOREST = PIN[ss]TO NE[ss]XT STEP 2
150 F[ss]O[ss]RD = NE[ss]XT/EST
160 IF F[ss]O[ss]R=INT(FOOL) GOTO 190
170 IF F[ss]O[ss]RGE>ESSO THEN NEXT
180 PRINT NE[ss]XT
190 NEXT NE[ss]XT
```

NEXT MONTH

Watch For These Upcoming Issues

Commodore Microcomputers, May/June: How will we use computers ten, fifteen, even fifty years down the road? We take it out of science fiction and into reality in our "Future Computing" issue—where some of our most knowledgeable writers consider what's happening in computing today and what that means for tomorrow.

AND THERE'S MORE

- Modems are becoming common household appliances in France. Find out how the French are riding a revolutionary telecommunications system into the future. Is the U.S. next?
- An overview of the PROMAL language for the Commodore 64.
- Home applications programs to type and save: Budget Master, Net Worth Statement and a loan amortization schedule.

Commodore Power/Play, June/July: Tired of the same old arcade/action games? Take a look a the popular brain games that exercise your intellect instead of your wrist—trivia, text adventures, strategy games, word games and more.

AND YOU'LL ALSO FIND

- Reviews of the hottest new games including Hitchhiker's Guide to the Galaxy, Ultima IV, Kennedy Approach and Spy vs Spy.
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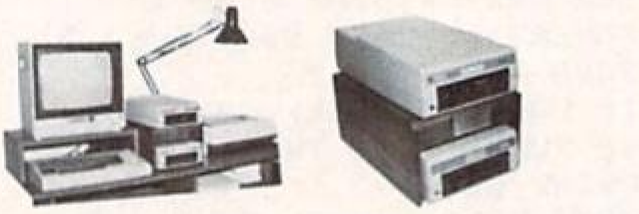

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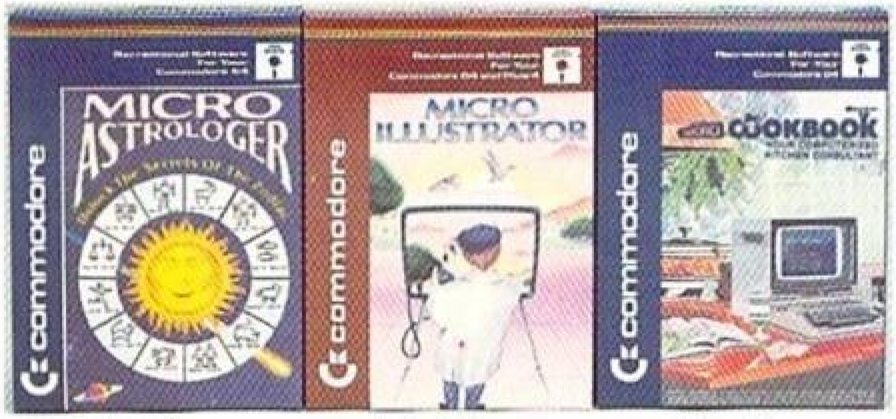

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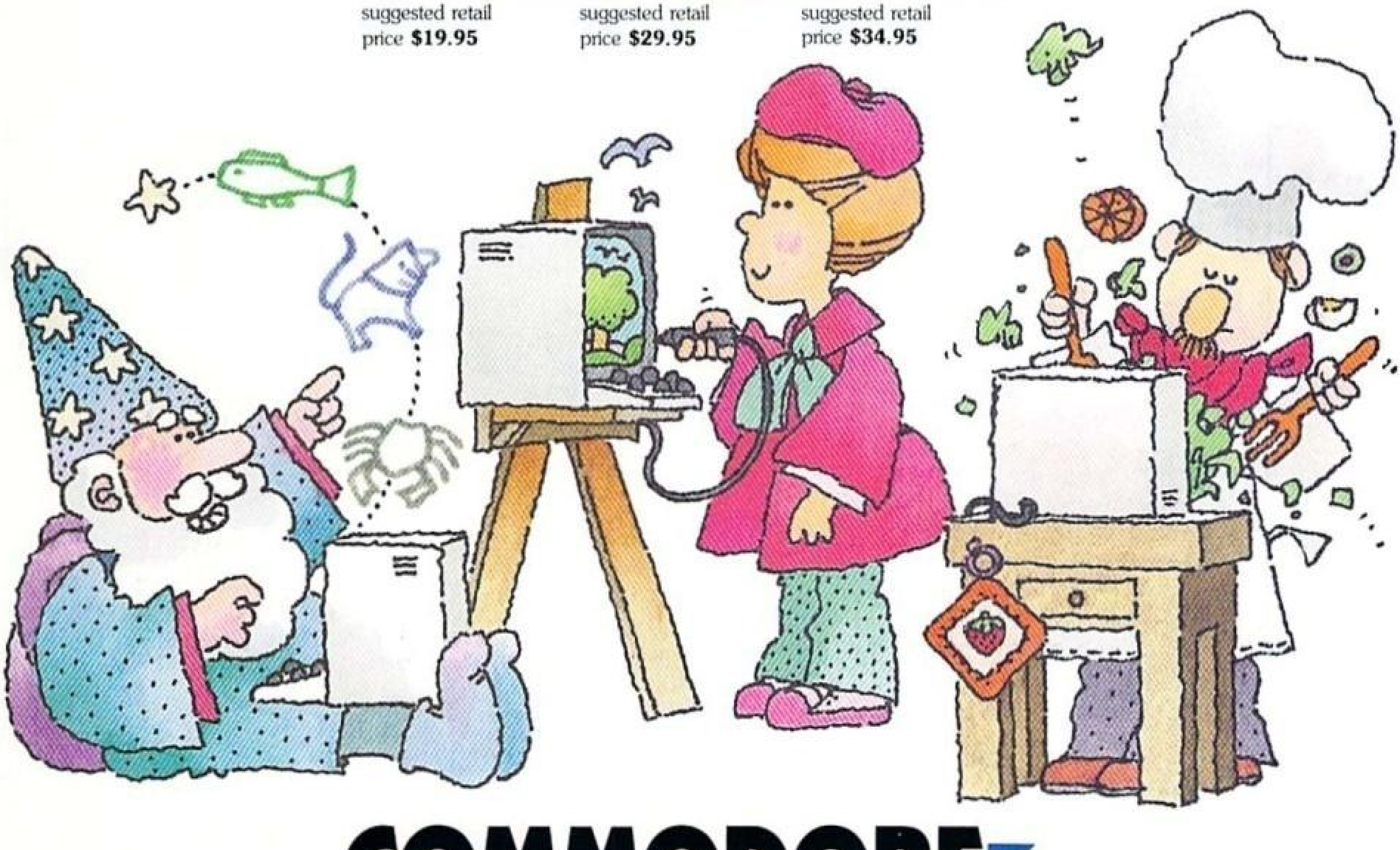

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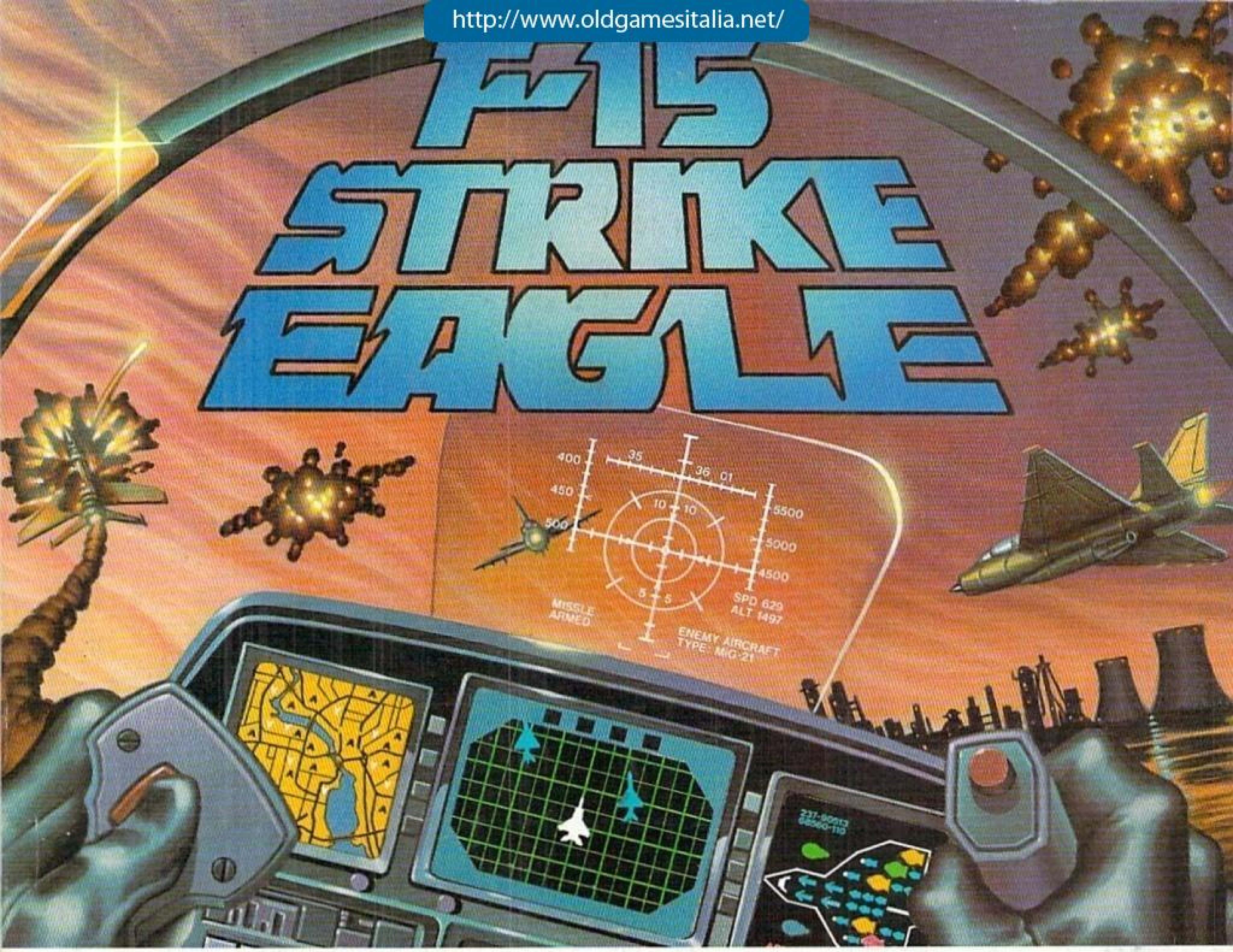

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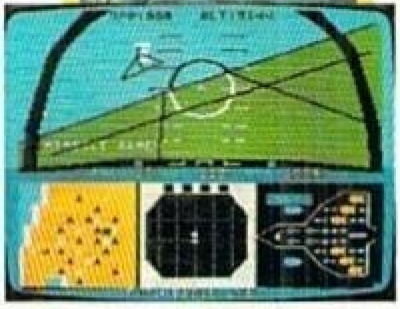

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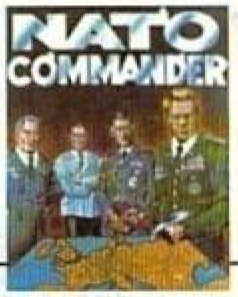

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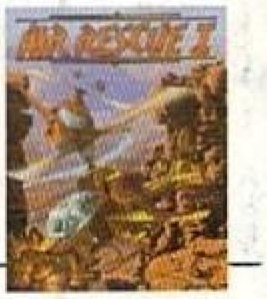

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